Products Finishing

CLEANING
PLATING
POLISHING
FINISHING

DECEMBER 1952

Saving Nickel

Lea Copper-Glo

Something New in Bright High Speed Copper Plating

The Ronal Bright Copper Process* using Lea Copper-Glo is the answer to the platers' prayers because it answers the problem of extreme nickel shortages.

Lea Copper-Glo makes it practicable to plate properly prefinished steel and die-castings *directly* with chromium without any intermediate buffing operation. It makes it possible for you to forget your nickel worries.

The user of Lea Copper-Glo enjoys numerous advantages as for example:

OPERATING

- Brilliant ductile deposits
- High current density with 100% efficiency
- Exceptional throwing power
- No wetting agents required
- Direct, interrupted or periodic reverse current

COST SAVINGS

- Reduces tank plating time due to high speed operation. (Hull cell bright current density range 10-60 amp./ft.²)
- Reduces rejects whether followed by bright nickel or otherwise; since it contains no wetting agents
- Reduces brightener costs to a few cents/100 gallons of plating solution per day

The Ronal Bright Copper Process using Lea Copper-Glo can be fitted into your plant operating cycle. Regular cyanide or Rochelle Copper baths can be readily converted to obtain these advantages. Write for further information.

* The Ronal Bright Copper Process, using Lea Copper-Glo®, is a development of Ronal Chemicals, Brooklyn, N. Y.

Burring, Buffing and Polishing . . . Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions

®

THE LEA MANUFACTURING CO.
16 Cherry Avenue, Waterbury 20, Conn.
LEA MFG. COMPANY OF CANADA, LTD.
370 Victoria Street, Toronto 2, Canada

STOP THE BIGGEST THIEF IN AMERICA

OAKITE GIVES YOU THREE WAYS TO FIGHT RUST

Day and night—wherever your steel is stored or handled—RUST, the biggest thief in America, is robbing you of production, robbing you of profit.

Oakite can help you defeat rust these three ways:

☆ **1 By removing rust from raw steel**—often eliminating pickling by removing rust and oil in one operation.

☆ **2 By preventing rust during processing**—protecting your steel all the way from stamping to shipping.

☆ **3 By preventing under-coat rusting of painted products**—combining cleaning, paint-conditioning and rust-prevention in one operation.

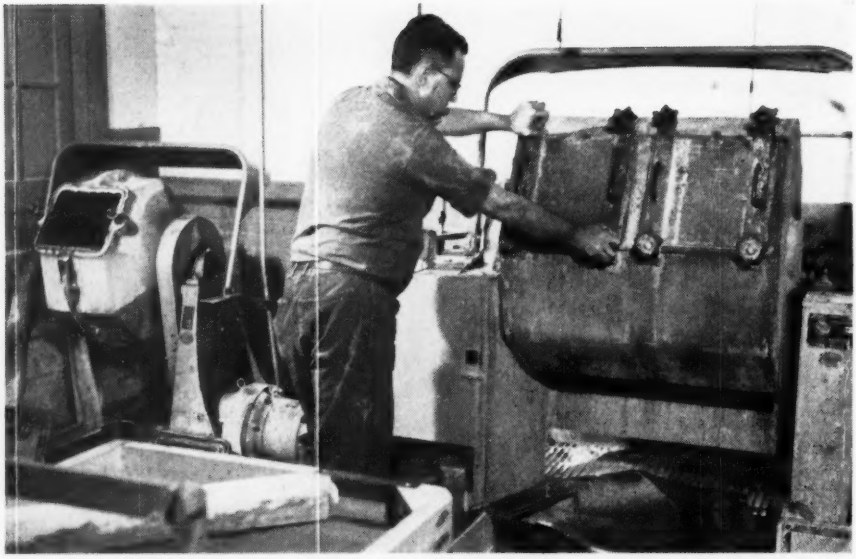
FREE For the Oakite Anti-Rust Kit that tells about these three big ways—plus several other methods—to stop RUST in your plant, write to Oakite Products, Inc., 20 Rector St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada



One of a number of different Tumbling barrels in which sample parts are processed in the new Norton barrel-finishing department.

New Norton Sample Processing Department Helps Manufacturers Speed Up Production

Plan now to take advantage of this new enlarged service department.

If you'd like to find faster methods for deburring and forming uniform radii on vitally needed parts — or if you have special problems in finishing parts ranging from tiny needles to castings and forgings weighing several pounds — send us samples of your parts. Tumbling is very likely the answer to your problem. And the new Norton sample processing department is the ideal set-up for finding just exactly what you can accomplish through barrel-finishing. Many manufacturers have already realized substantial savings and speed-ups in production through this service.

This new Norton department has a variety of Tumbling barrels of different types and capacities plus auxiliary equipment such as a mechanically vibrated screen. Here, Norton production engineers determine for you — without charge or obligation — just exactly what tumbling can do for the metal parts you send. Detailed recommendations are then given so that you can know exactly how to get the best results for your particular problem. These recommendations include barrel type, size and speed, size and amount of ALUNDUM* Tumbling Abrasives to be used, amount of water, type and amount of compound or cleaner, time cycles and other data.

Send Samples Now

For sample processing, we need: representative sample parts plus (a) the finished sample to be matched (hand-finished, if necessary) and (b) information on your present barrel-finishing equipment, if any, including type and size of barrel and barrel speeds. These should be sent to Norton Company, Worcester 6, Massachusetts, attention of Sales Engineering Department, Abrasive Division. About a week is required for processing the samples after they have been received.

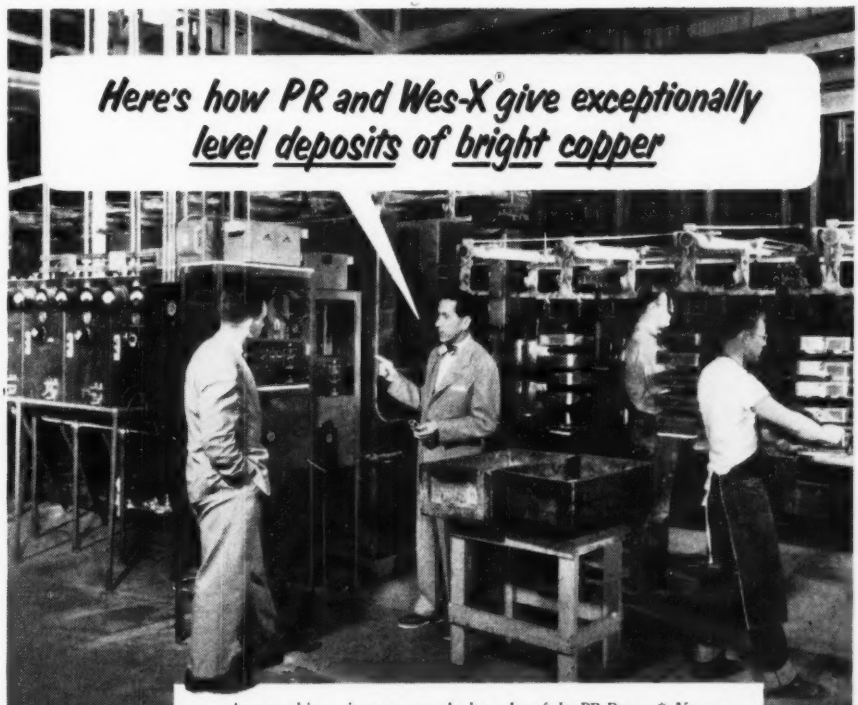
Meanwhile, for further information get the 55-page Norton handbook on barrel-finishing. Ask your Norton Distributor for Form 501 or write us direct.

*Trade-Mark Reg. U. S. Pat. Off.

NORTON COMPANY, Worcester 6, Mass.
Distributors In All Principal Cities
Export: Norton Behr-Manning Overseas
Incorporated, Worcester 6, Mass.

NORTON
ABRASIVES
Making better products to make other products better

Here's how PR and Wes-X® give exceptionally level deposits of bright copper



. . . because this equipment controls the pulse of the PR Process*. You see by reversing the current periodically and including H-VW-M's Wes-X addition agent in the bath, you get a cyanide copper deposit that is smoother, brighter with unusual levelling properties. The surface is so smooth that preliminary polishing of steel parts and subsequent buffing operations can be greatly reduced. PR and Wes-X copper is also being used successfully as a substitute base for chrome plating.

And here are some additional advantages with PR and Wes-X: Higher current densities are possible, denser metal structure with greater corrosion resistance, heavier deposits without buildup of trees and nodules, and even better anode corrosion due to the periodic change of polarity. Effective plating speed is exceptionally high.

PR plating with H-VW-M Wes-X is only one of many results of over eighty years of constant electroplating and polishing development—a continuing policy summed up in H-VW-M Platemanship . . . your working guarantee of the best that industry has to offer—not only in plating processes—but in every phase of plating and polishing.

* PR Plating Process is a development of Westinghouse Electric Corp., covered by Patents #2451340 and #2451341. License Agreements are available through H-VW-M.

8653

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

For full information on Wes-X bright copper plating and the PR Process ask for Technical Instruction Bulletin.*

HANSON-VAN WINKLE-MUNNING CO., MATAWAN, N. J.
PLANTS AT MATAWAN, N. J. • ANDERSON, INDIANA
SALES OFFICES: ANDERSON • BOSTON • CHICAGO • CLEVELAND
DAYTON • DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE
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H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

"FINISHING KNOW-HOW"

SYNTHETICS
•
VARNISHES
•
ENAMELS
•
LACQUERS

Yours for the asking are all the benefits of the highly specialized knowledge of your Egyptian Industrial Finishes Technician.
The Know-How gained from thousands upon thousands of finishing problems, all successfully solved by Egyptian Laboratory ingenuity, uniquely equips the Egyptian Organization to be your finishing consultant.
Whether your problem is to develop a coating to add life and durability to your product . . . one to perk-up sales appeal . . . a system to speed production or an exacting formula to meet defense work specifications . . . you'll find the quick, the easy, the efficient way is to call on Egyptian Finishing Know-How.

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INDUSTRIAL FINISHES

The EGYPTIAN LACQUER MANUFACTURING CO.

Box 444, Newark 1, New Jersey
Plants: South Kearny, N. J. • Lafayette, Ind.

EZRA A. BLOUNT, *Editor*
(On leave of absence
U. S. Air Force)

Products Finishing

December 1952
VOLUME 17 • NUMBER 3

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BLAKESLEE degreasers use less solvent.

ECONOMY is the key to Blakeslee Solvent Vapor Degreasers. Comparison proves that through patented construction and operational features you save more on solvent—gives you lower production costs. "Use less solvent to clean parts of any size or shape."

Write today for full information

BLACOSOLV the highest stabilized degreasing solvent

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CHICAGO 50, ILL.

SOLVENT VAPOR DEGREASERS in standard or special conveyor models

NIAGARA-METAL PARTS WASHERS—built to fit your needs

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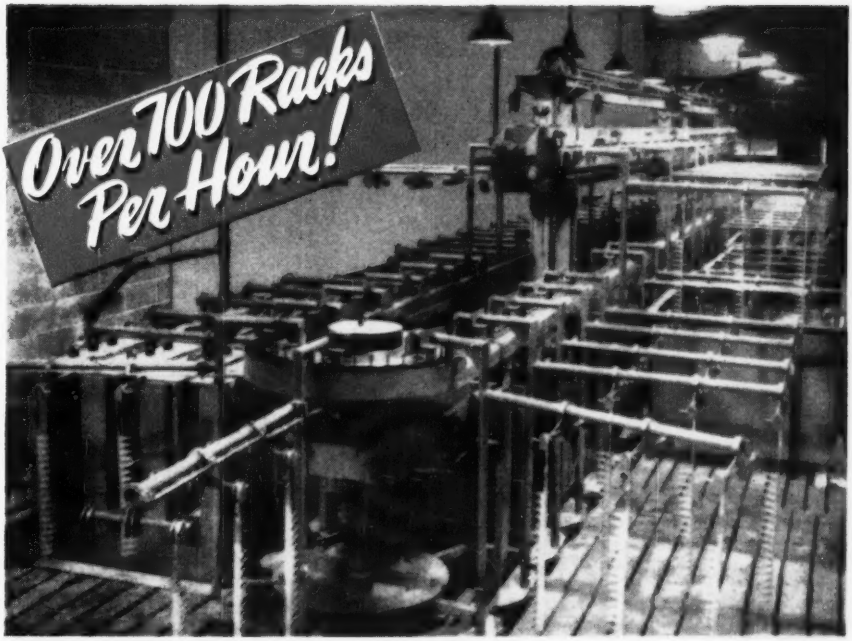


Lasalco's **VERTICAL-LIFT FULL AUTOMATIC**

Floor Area, Only 74' x 15'

Another production-boosting, profit-making installation by Lasalco:

- Now used for anodizing, the above equipment can be easily arranged for plating by a simple, quick and inexpensive conversion.
- Driving power for the entire machine is hydraulic. The elimination of speed reducers and all excessive mechanism results in much lower maintenance cost.
- Only two operators, to load and unload, can maintain maximum production.
- In plating work using several acid dip tanks, or in anodizing work requiring two or more dye tanks, selective operation is easily arranged to permit either the use or bypassing of one or more tanks.

From all available information this machine is the fastest producer ever installed in so small a floor space—74' x 15'. If you want to expand production and reduce operating and unit costs, Lasalco engineers will be happy to give you complete details and discuss your problems without obligation.

Racks shown in illustration are 24" long, 4" wide, 3" thick.

Write Today!

LASALCO, INC.

2818-38 LASALLE STREET • Tel. GRand 2990 • ST. LOUIS 4, MISSOURI

ABBOTT

deep hardened and polished carbon steel

BURNISHING MATERIALS

for superior barrel finishing of

Military and Civilian parts and products

Abbott barrel finishing experts are ready to help you solve your burnishing problems with five scientifically designed shapes which make effective contact on parts, stampings and castings of every size and shape.

Write for details. No obligation.

THE ABBOTT BALL COMPANY
1064 NEW BRITAIN AVE.
Hartford 10, Conn. U.S.A.

. . . and get NEW ANODES from YOUR NICKEL SCRAP

Since this advertisement first appeared in 1950, we've re-converted many, many thousands of pounds of nickel scrap into good oval anodes. This service of Wagner Brothers has enabled many shortage-ridden platers all over the country to keep going on the ends, swords and stubs salvaged from their scrap bins. If you have any such "worthless" electrolytic nickel on your hands, why not send for a quotation. It may be just what you need—a reliable source for low-cost nickel. We'll cast your own metal, drill and tap for hooks and ship to you ready for use, all within a matter of days. The cost of this service is trifling and you get full use of the pure metal you paid for originally. Our process is under strict metallurgical controls, your assurance of maintenance of the original purity.

The volume we handle necessitates a standard ordering and shipping procedure. Please fill out coupon or write; we'll send directions and quotations on any quantity.

Wagner BROTHERS INC.

632 MIDLAND • DETROIT 3, MICH.

We have electrolytic nickel anode scrap for re-conversion.

Stubs, average length _____ inches

Weight (less hooks) _____ pounds

Swords, average length _____ inches

Weight (less hooks) _____ pounds

Shipment can be handled in

☐ Strapped bundles ☐ By Rail

☐ Drums ☐ By Truck

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Are you SURE you're USING THE MOST EFFICIENT FINISH?

If your production involves finishing zinc, cadmium, aluminum or cuprous metals, you owe it to yourself...and your customers...to investigate

IRIDITE®

for on any of these metals Iridite gives you a high performance finish at a low cost from a simple chemical dip

IF YOU WANT HIGH CORROSION RESISTANCE... you'll find an Iridite that will meet any military or civilian specifications for chromate finishing.

IF PAINT ADHERENCE IS IMPORTANT... you'll find Iridite prevents underfilm corrosion and soap formation.

OR, FOR BRIGHT, DECORATIVE FINISHES—

investigate zinc plate and Iridite (Bright) for a chrome-like decorative finish with more corrosion protection than conventional chrome plating . . . or Iridite (Metcote) as a treatment for copper that eliminates the need for buffing in the copper-chrome system; produces a sparkling bright finish!

Write for literature and send us samples for test processing. See "Plating Supplies" in your classified telephone directory or write direct.

Iridite is approved under government specifications.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals; ARP Plating Brighteners.

Completely Finished . . .

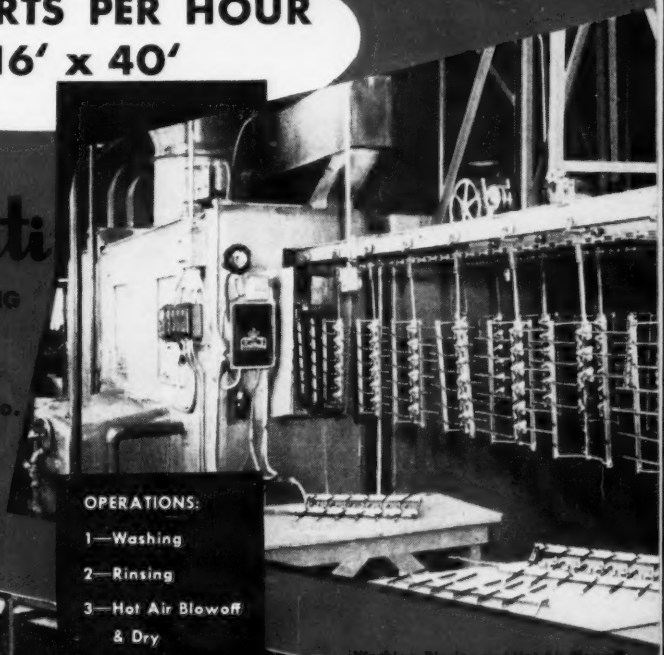
1000 PARTS PER HOUR in Space 16′ x 40′

ENGINEERED BY . . .

Cincinnati

CLEANING AND FINISHING MACHINERY CO.

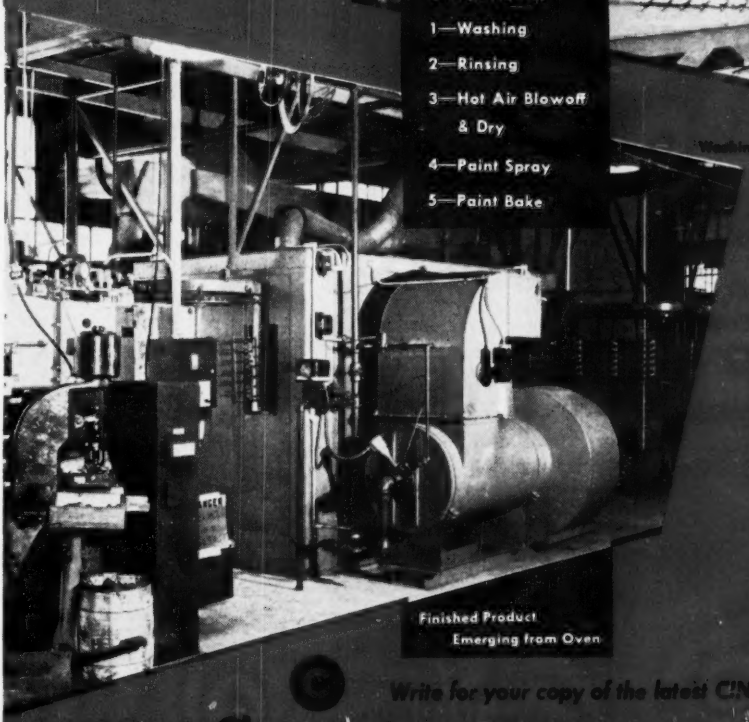
at The George R. Carter Co.
Detroit, Mich.



Washing, Rinsing and Hot Air Blowoff

OPERATIONS:

1—Washing
2—Rinsing
3—Hot Air Blowoff & Dry
4—Paint Spray
5—Paint Bake



Finished Product Emerging from Oven

Unusually compact, this CINCINNATI-engineered small parts finishing system has proved to be a major improvement in The George R. Carter Company's production facilities. Complete finishing operations on automobile trim hardware, parts are performed efficiently and quickly.

With a minimum of adaptation this Cincinnati system can handle a large variety of small parts. Representative installations have shown savings up to 75% in time and cost.

Write for your copy of the latest CINCINNATI catalog today!

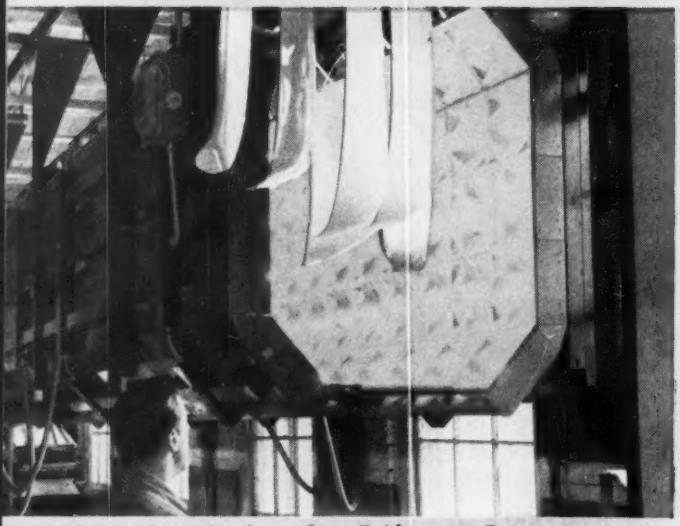
Cincinnati CLEANING & FINISHING MACHINERY CO., INC.

811 HEGA STREET IRONTON, OHIO

Proved in over 7.

MOST EFFICIENT OF

TYPICAL FOSTORIA OVENS



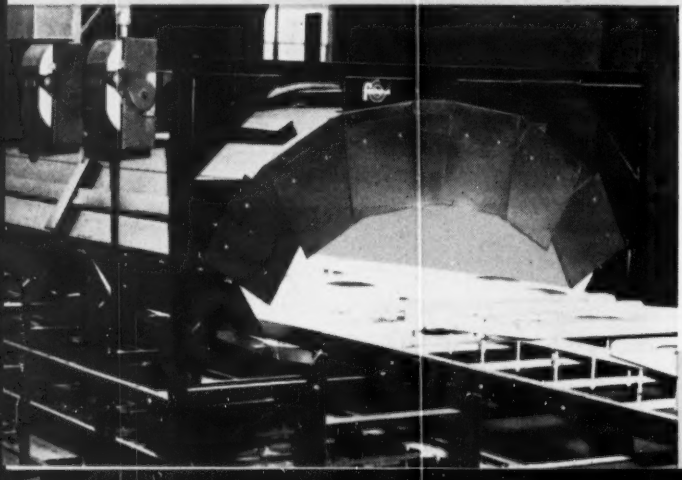
ABOVE — Casco Products, Inc., Bridgeport, Conn., reports reduced operating cost with Fostoria Infra-red. Drying is accelerated and uniform with improved quality of finish over other methods. Various sections of the oven are controlled separately. Ceiling suspension saves floor space.

INSTANT RESPONSE

No Warm-up Time
No Shut-off Lag
Fastest Baking Method

MOST UNIFORM HEAT DISTRIBUTION

Evenray Reflectors Prevent Streaks, Hot or Cold Spots



TO THE LEFT — Athens Stove Co., Athens, Tenn., uses Fostoria Infra-red for drying porcelain enamel before firing. They report (1) 4 times faster than other methods, 30 to 60 seconds drying time, (2) one-fourth less floor space, (3) cleaner, no combustion residue on work, (4) less maintenance, (5) thorough drying — no rejects.

THE FOSTORIA

Oldest

000 Plants

ALL FINISH BAKING OVENS

FLEXIBILITY CONTROLLED
Infinitely Variable Output from 0 to 100%

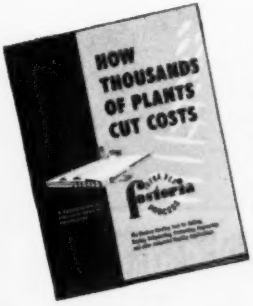
LEAST SPACE
Most Production for Oven Size
May Be Ceiling Mounted

LOWEST ENERGY LOSS
Gold Plated Oven Walls Give 98% Efficient Reflection

SAFEST CLEANEST, FINEST QUALITY BAKING
Outperforms Any Oven of Any Type

LOWEST "PER UNIT" PRODUCTION COST
•
LOWEST MAINTENANCE COST

FOREMOST ENGINEERING "KNOW-HOW" *and* **FIELD SERVICE ORGANIZATION**



SEND FOR COMPLETE FACTS—Write for this brochure of technical facts on Infra-red with case histories of many installations. Tell us about your particular problem and we will include data directly applicable to your operations.

INFRA-RED fostoria OVENS

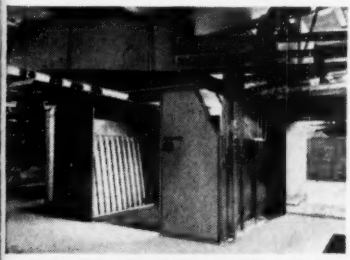
PRESSED STEEL CORPORATION, Fostoria, Ohio
and Largest Manufacturer of Industrial Infra-red Ovens

For Auld Lang Syne
To our many friends –
old and new
We wish the best of
Holiday Seasons
Merry Christmas
Thirty Years Service to The Metal Finishing Industry
MAC DERMID
Incorporated
WATERBURY 20, CONNECTICUT
THISTLES OF SCOTLAND

Schmieg Complete FINISHING SYSTEMS

These photographs of SCHMIEG finishing equipment recently installed in the ultra-modern plant of a large manufacturer of kitchen equipment and other metal specialty items.

Above is SCHMIEG air supply equipment located in the building penthouse. During operation, doors in equipment enclosure are closed. Stack and fan is one of five stacks from spray booths on the floor below.



SCHMIEG Uni-Flow prime spray booth looking into booth from operator's side. Door in foreground is closed during operation of the booth.

ask the Engineers...

Why SCHMIEG Finishing Systems give best performance per dollar invested.

It's no secret that design experience and engineering skill have put SCHMIEG out in front, where careful planning and reasons of economy are most necessary for specific plant installations.

SCHMIEG Uni-Flow SPRAY BOOTHS offer important advantages in space saving and operating economy.

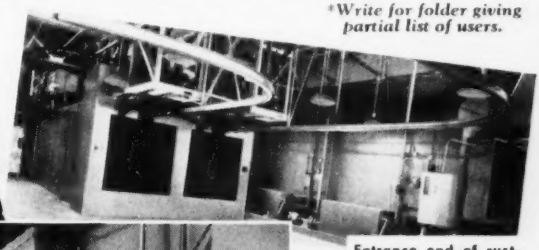
SCHMIEG Industrial OVENS are recommended by engineers who know, for hundreds of uses that save dollars in plant operations.

So also the SCHMEIG mesh-belt, conveyor type WASHERS, and the automatic circular types which time, index and rotate parts through wash, rinse and blow-off steps—operated by a single worker.

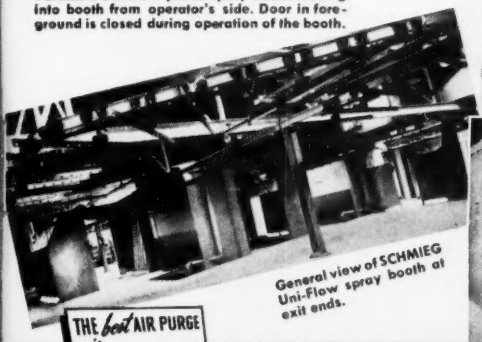
For the very best aids to efficient, money-saving industrial operations, ask the engineers who know*—about SCHMIEG. Then call in *our* engineers to design units ideally suited to your specific needs.

SCHMIEG Centri-Merge dust and fume elimination units have been acclaimed as the best solution to the problem of removing dust and fumes, in any industrial application.

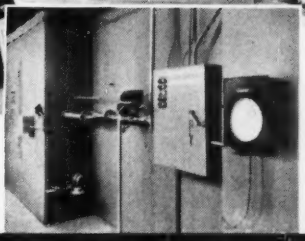
**Write for folder giving partial list of users.*



Entrance end of rust-proofing machine. Exit end of prime and finish ovens. Note pusher conveyors to convey work through ovens.



General view of SCHMIEG Uni-Flow spray booth at exit ends.



External view of Dry-off oven. Direct fired heating equipment and circulating fans are located in offset section of oven. All controls are in panel in foreground.

THE *best* AIR PURGE is CENTRI⊙MERGE

Schmieg INDUSTRIES INC.
Engineers & Manufacturers

P. O. BOX 4701 • DETROIT 34, MICHIGAN

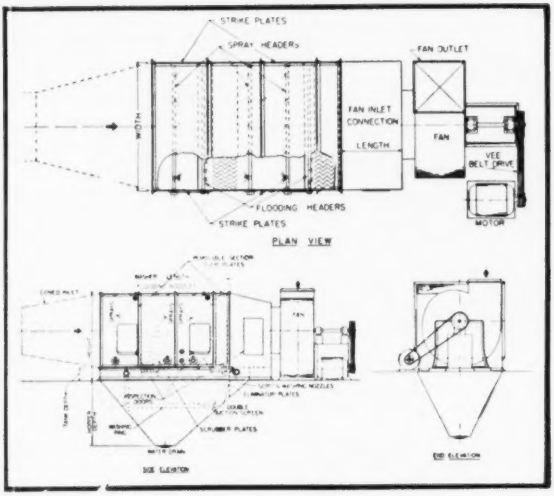
"Buffalo"

Tips on DUST ELIMINATION

FOR EASY MAINTENANCE AND LOW COST

Specify a

WET-DUST ARRESTOR



. . . such as the "Buffalo" Type "DC" Static Air Washer shown in the sectional views above. First, it operates at low resistance, doing a thorough air cleaning job by passing air through three main banks of sprays, a set of scrubber plates and a set of eliminator plates. Second, the dust collects in the hopper at bottom for easy removal. Third, since plates are under constant spray, regular cleaning maintenance is simple and odors are halted. The arrangement shown above is for dust loadings up to eight grains per cubic foot, though units for heavier loadings may be had. "Buffalo" builds a complete line of dust handling equipment to solve each problem most efficiently. Write today for Bulletin 3181-B.

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

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PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

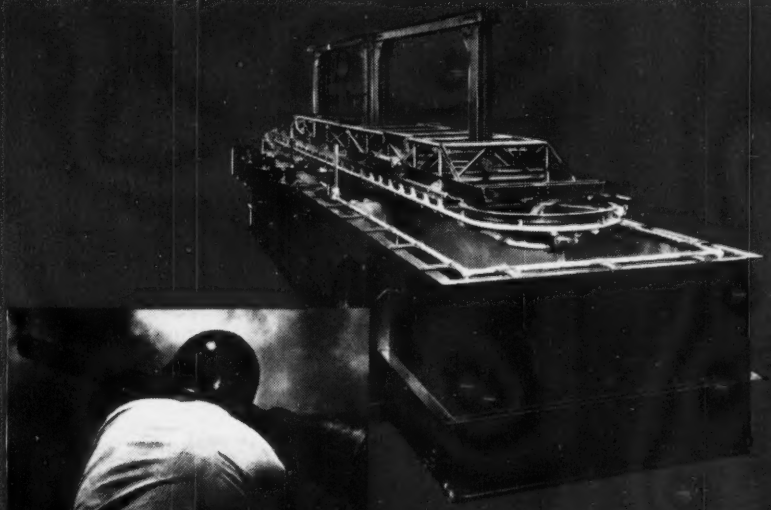
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

DIAMOND JUBILEE 75TH ANNIVERSARY

FORCED DRAFT | PRESSURE BLOWING | HEATING | COOLING
VENTILATING | AIR CLEANING | AIR TEMPERING | INDUCED DRAFT | EXHAUSTING

THE *Udylite* MACHINE BEHIND THE SHELL!



International Register Chooses Udylite . . . lowers costs . . . plates fuse assemblies better!

International Register of Chicago chose Udylite equipment to provide a tough, durable finish for vital fuse parts.

With Udylite equipment they're sure that finished fuse assemblies contain no rack marks or shadows. A special lift, which is part of the Udylite rack conveyor, raises racks clear of the plating solution so they may be easily turned.

Further proof of the effectiveness of Udylite processes and equipment is found in the fact that five other companies have ordered the same equipment to meet their requirements for similar jobs.

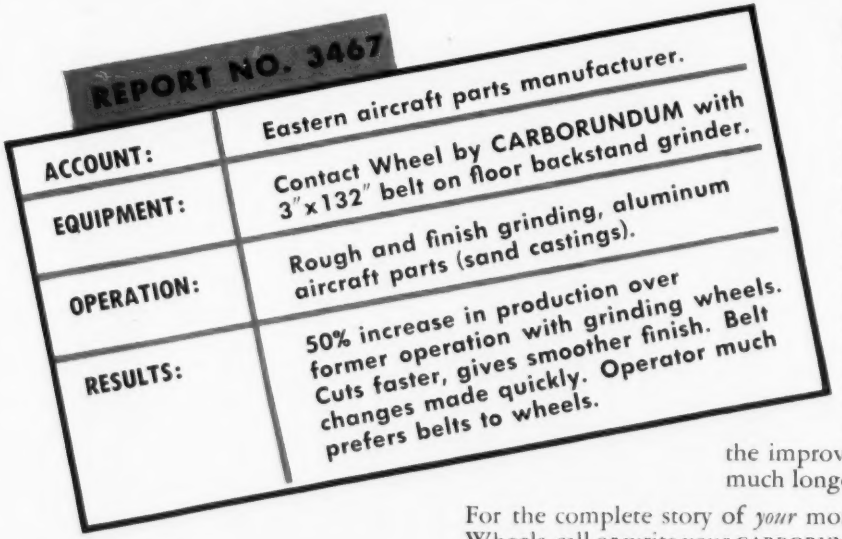
Udylite equipment can give *your* products the same uniform results. Call your Udylite representative today and let him show *you* Udylite short cuts to better plating. . . . or write The Udylite Corporation, Detroit 11, Michigan.

THE *Udylite* CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING . . .

MORE USERS SAY...

...for LOWER grinding costs ...use the "T-61" CONTACT WHEEL


REPORT NO. 3467
ACCOUNT:
Eastern aircraft parts manufacturer.
EQUIPMENT:
Contact Wheel by CARBORUNDUM with 3"x132" belt on floor backstand grinder.
OPERATION:
Rough and finish grinding, aluminum aircraft parts (sand castings).
RESULTS:
50% increase in production over former operation with grinding wheels. Cuts faster, gives smoother finish. Belt changes made quickly. Operator much prefers belts to wheels.

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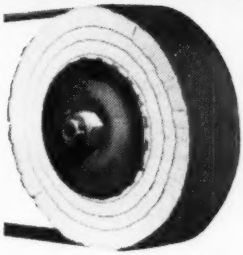

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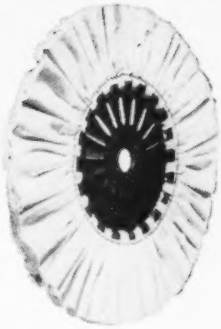

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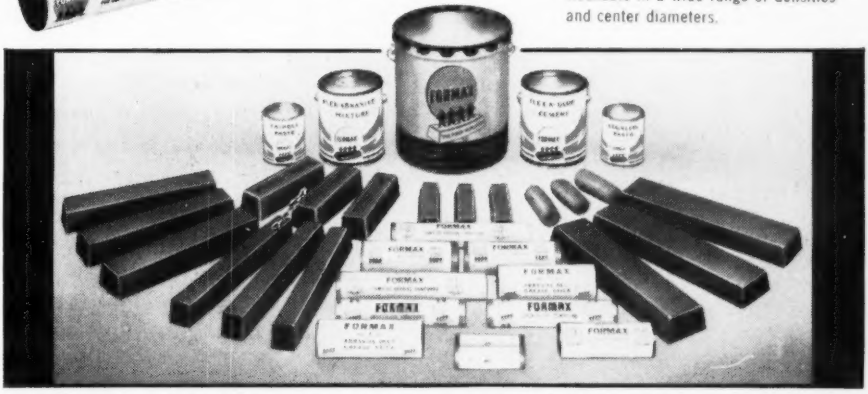

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Corrosion Proofing Grumman War Planes

By FRANK L. BONEM

Metals making up the Navy planes receive a conversion coating and are painted, or plated. How Grumman meets Navy specifications on its planes, in particular the F9F Panther, is related in this article.

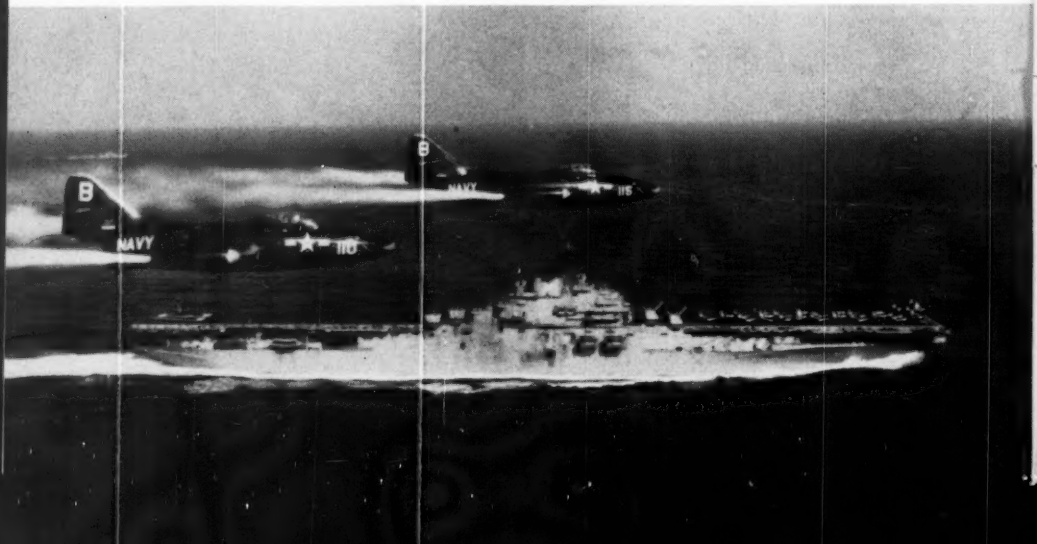
PF FEATURE

Over 600 m.p.h.! That is the speed of the Navy F9F, first of the jet fighters to be used in combat by the Navy and Marines. Flown from carriers and land bases in the Far East, it has already accounted for many MIG-15 North Korean fighters.

At the sonic and super-sonic speeds of this plane, forces which act upon the surface, and therefore the finish, are greatly accentuated. Compressibility, which at low speeds is no problem, is felt as a "shock" wave at the speed of sound since the plane outruns its advance pressure wave. As a result, leading edges of wings, stabilizers, and the fuselage smash into static air, the air in turn exerting a force on these points of the plane. When it is taken into consideration that the magnitude of these forces, in pounds, is proportional to the square of the velocity, in f.p.m., a rough estimate of the impact forces may be realized.

Other forces affecting the finish are dust abrasion, caused by solid particles

Official United States Navy photograph.



Official United States Navy photograph.

of industrial waste products, coral or other dusts, and air friction which, at high speeds, raises the temperature of the metal to such heights as to endanger the paint finish.

Corrosion is probably the most detrimental force acting on the finish of Navy planes. Due to the very slim factor of safety, the deterioration of the finish and the metal underneath is of utmost significance.[1]

Naval aircraft, by the very nature of their missions, are close to the ocean. Therefore, salt spray and high relative humidity are ever present, and their corrosive effects must be minimized by proper surface finishes.

Other corrosion hazards for the carrier or land-based jets are gases emanating from the ship's stacks or from exhausts of other planes closely crowded on the flight deck; volcanic ash which contains many corrosive chemicals[2]; the coral landing strips which are regularly wetted down with salt water; and factory wastes in the atmosphere above industrial cities.

To withstand these severe conditions, Navy Specifications are rigid and provide:

1. Aluminum Alloys: Anodize (AN-QQ-A696) or chemical treatment (MIL-C-5541) except as follows: Seaplane exteriors must be anodized. 5 per cent chromic acid permitted on 2S, 3 S, 52S, 61S, and Clad[3].
2. Magnesium Alloys: One of treatments described in Specification MIL-M-3171.
3. Corrosion and Heat Resistant Alloys: None except for dissimilar contact.
4. Other Steel: Normally use Cadmium Plate (QQ-P-416) or Zinc Plate (AN-P-32).

For paint protective systems different numbers of coats of zinc chromate primer MIL-P-6889, Lacquer AN-L-29, or MIL-L-6805, Enamel or Varnish MIL-E-5556, MIL-V-6894, and Coating Permanent Resin MIL-R-3043 are specified for various interior and exterior surfaces.

Anodizing

At each of the several Grumman plants on Long Island, New York, a separate department is set aside for

[1] For a complete discussion of corrosion on naval planes, see Prevention of Corrosion on Naval Aircraft; "Corrosion"—National Association of Corrosion Engineers; Oct. and Nov., 1951.

[2] Iwo Jima has been stated to be the most notorious of the islands in this respect.

[3] From MIL-S-5002.

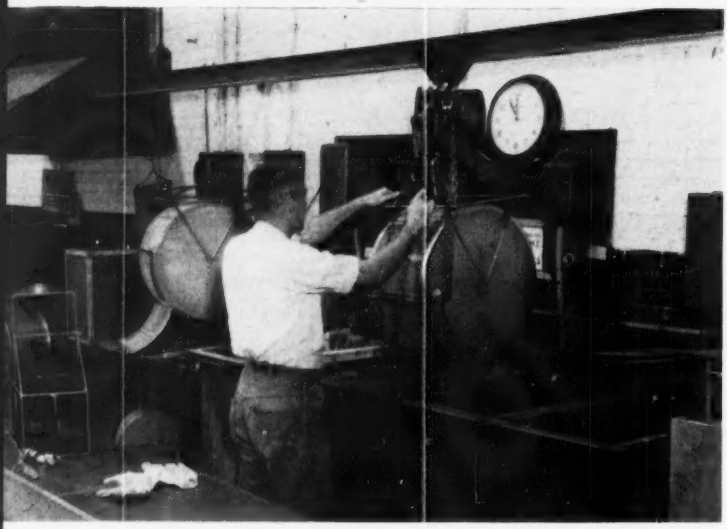


Fig. 1—The pilot plant setup, moved to the production floor for Alodizing small parts in baskets.

producing conversion coatings, for plating, and for painting. Conversion coatings were originally achieved exclusively by anodizing in chromic acid, four separate installations being employed.

With the broadening of Navy Specifications to include chemical conversion coatings for many of the surfaces of the airplane, the process engineering department tested "Alodine"[4] in the laboratory, then in a pilot plant installation, and carried the investigation to a fruitful conclusion by installing the dip process for regular production to handle large parts.

Very recently, a spray installation has been put into operation for processing parts that could be conveyorized, and a second dip installation has been made for processing assembled wing sections.

The pilot plant, having served its initial purpose, has been moved from the laboratory to the production floor and is used for parts that are too small to be handled on a conveyor.

As may be seen from Fig. 1, this installation consists of five 60-gallon tanks, a traveling hand hoist, and two stainless steel drums which are suspended from the hoist and can be turned on their axis by the operator even when immersed in the solutions.

Processing steps and solutions used are as follows:

1. Clean with "Ridoline"[5] 3192, plus 2 per cent "Ridosol."
2. Rinse in water.
3. Form conversion coating in "Alodine," held at a temperature of 110 deg. F.
4. Rinse in water.
5. Acidic rinse in "Deoxylyte," held at a pH of 2.7.
6. Air dry.

The major dipping installation, used for processing fuselage, wing, and tail assemblies (see Fig. 2), consists of six tanks. Following are the steps taken in their process and the solutions used:

1. Clean in "Ridoline" alkali cleaner (3-4 oz./gal.) at 160 deg. F. for 2-3 minutes. This solution is air-agitated for improved circulation and more effective cleaning.
2. Instantaneous rinse in water at room temperature.
   (a) Rinse with water spray as parts emerge from tank. This rinse washes off all remaining traces of alkali

[4] Reg. Trademark, American Chemical Paint Company.

[5] Reg. Trademark, American Chemical Paint Company.

and contamination that may have been picked up as the parts emerged from the tank. Nozzles for this spray are located in the frame from which the parts are hung and may be clearly seen in Fig. 2.

3. Alodize in "Alodine" at 110 deg. F. for 1½ to 2 minutes. The solution is made up of "Alodine" No. 2 at a concentration of 18 lb./gal. and 10 per cent (by volume) of liquid "Alodine" No. 100.
4. Instantaneous water rinse at room temperature.
5. Dip in "Deoxylyte" at 100 deg. F. for 15 seconds. This bath is held at a pH of 2-3 and has a concentration of 1/20-¼ of 1 per cent by volume. Its purpose is to neutralize traces of alkali salts and leave the surface in a slightly acid condition.
6. Dry for 15 minutes in steam heated air.

All tanks are of the same "L" shape and have the same dimensions, 24 feet long by 3 feet wide with a 3 by 6-foot leg. These dimensions provide 90 square feet of surface area, and with a depth of 6 feet, about 56 gal./inch. The tanks are made of mild steel; aluminum painted on the outside. The "Alodine" tank has an exhaust duct along the upper edge through which all fumes are withdrawn, and is lined with Koroseal to resist corrosion.

Water rinse tanks are installed at slightly different elevations and have overflow weirs. Drainage flows from the weir of the last rinse tank back to the first and then to the sewer, thereby reusing, and saving a considerable amount of water.

Temperatures are controlled automatically through a Brown recording and controlling instrument. Cycle time is controlled by the hoist operator with a timer on the hoist switch.

Racks, from which the parts are hung, have lugs which fit the edges of the tanks. They are moved through the processing cycle by an overhead electric hoist running on two I-beams. A small basket, similar to the ones used in the pilot plant installation, is suspended from the rack for treating small parts, thus utilizing all available space on the rack.

Fig. 2—A view of Dip-Alodizing installation used for processing fuselage and wing assemblies. Note how L-shaped tanks are installed in pairs (foreground).

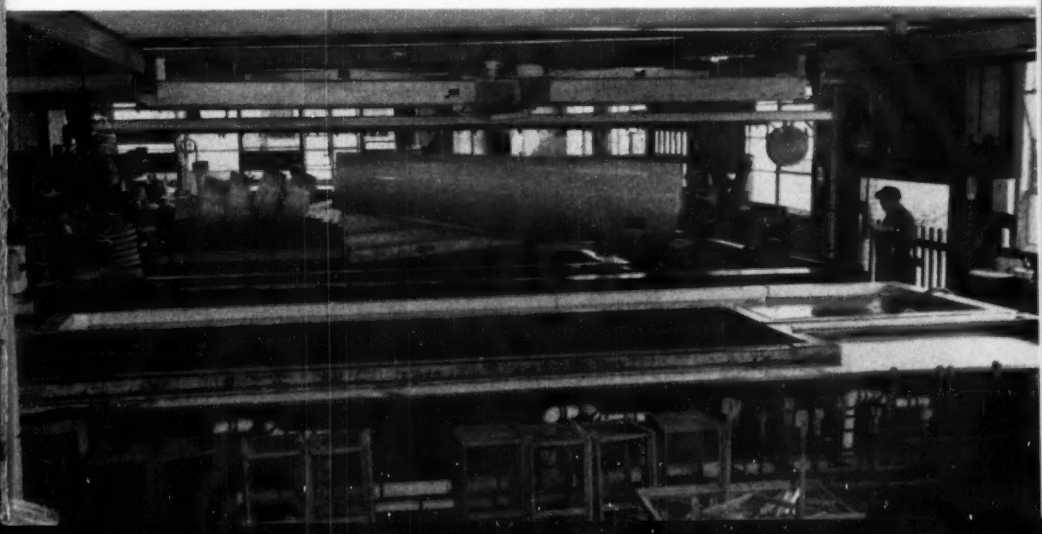
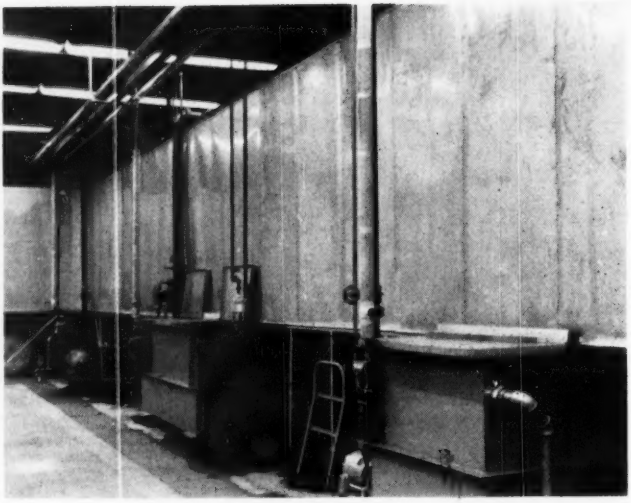


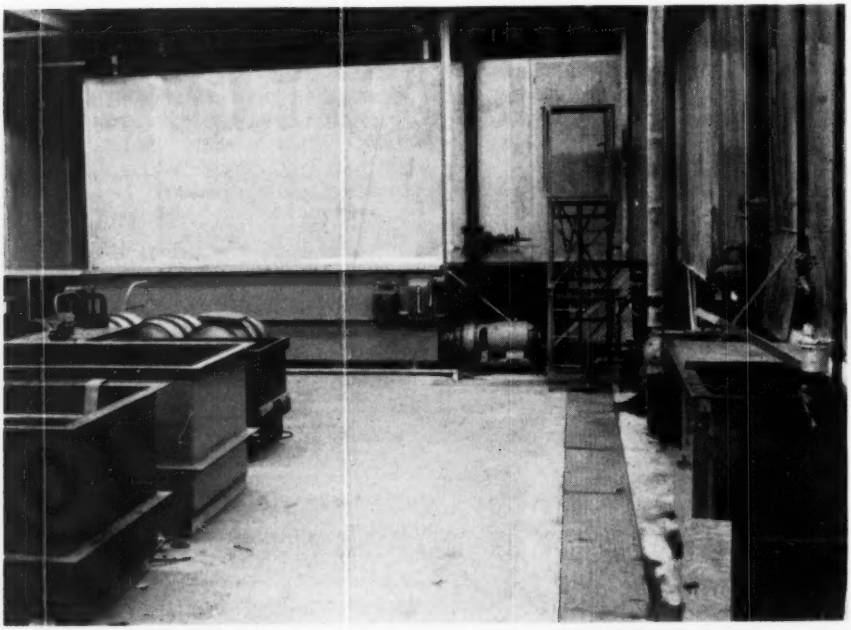
Fig. 4 — The central part of the spray installation showing the rinse stage in the corner; the "Alodine" stage; and the water rinse stage (right foreground).



●

Those parts that can conveniently be suspended from an overhead monorail conveyor are Alodized in a spray installation. Figures 3 and 4 show respectively the entrance and middle section of

Fig. 3—The Spray-"Alodine" installation. The entrance of the U-shaped setup is at the left, the "Alodine" stage at the right.



the installation at Grumman. The rectangular tunnel, located above the solution tanks, has a subway grating as a floor, thus making drainage to the recirculation tanks extremely simple. Walls and ceiling are made of mild steel except in the "Alodine" stage where stainless steel is used.

The stages and operating conditions of this installation are:

1. Preclean with "Ridoline" No. 46 at a temperature of 180-212 deg. F. for 34 seconds.
2. Rinse in water at room temperature for 27 seconds.
3. Alodize with "Alodine" at 110 deg. F. for 30 to 40 seconds.
4. Rinse in clear water at room temperature for 12 seconds.
5. Acidulated rinse with "Deoxylyte" (a phosphate-chromic acid neutralizing agent) at 160-180 deg. F. for 12 seconds.
6. Dry in steam-heated, hot air oven for 58 seconds.

Solutions are recirculated from tanks which, as mentioned previously, are located under the installation. Centrifugal pumps are employed to recirculate the solutions through spray pipes which have Vee Jet G. G. No. 10, $\frac{1}{4}$-inch nozzles. The spray forms a flat 67-degree cone under full pressure. Heat is supplied to the hot solutions through stainless steel Platecoils, the "Alodine" tank having two and the "Deoxylyte" tank having one. Other installation details are given in Table 1.

The overhead Link-Belt monorail conveyor has a 3-inch pitch standard No. 348 chain which travels at a speed of approximately 30 f.p.m. Trolleys are at 2-foot centers and carrying rods

Fig. 5—A view of the anodizing installation with a rack of ware ready to be lowered into the chromic acid tank. Sealing tank may be seen in center, hot air dryer at right.

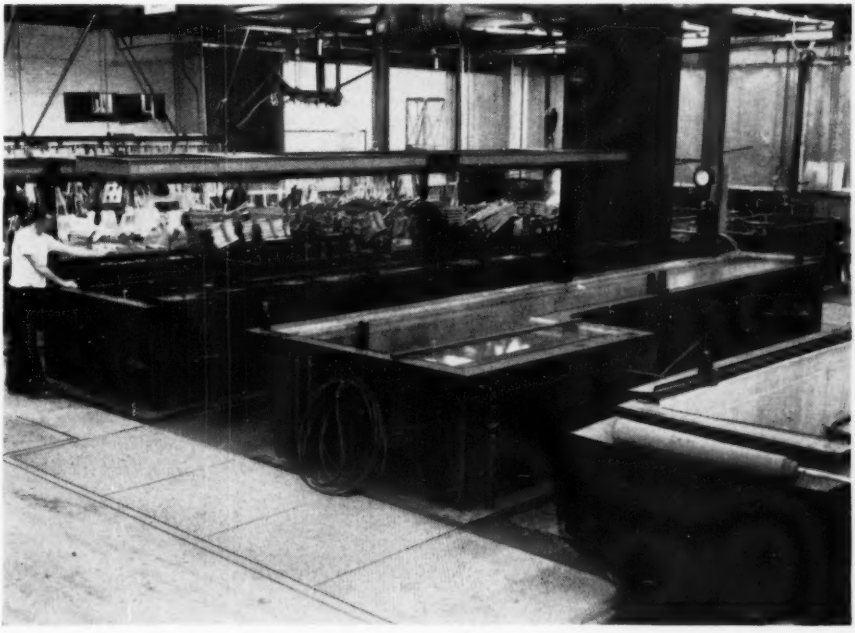


Table I

Stage	Tank Capacity (gallons)	Pump Capacity (g.p.h.)	Number of Spray Nozzles	Spray Pressure at Nozzles (p.s.i.)
1	2800	1250	286	20
2	1500	550	154	20
3	1500	425	425	10
4	785	155	154	40
5	785	155	154	40

at 9-inch centers. Parts are loaded on it just prior to its entrance into the precleaning stage, and unloaded a few feet from the dryer exit.

Solutions in both the spray and dip installation are kept up to standard by daily titration and testing of pH. Further, standard salt spray tests are made to ensure meeting Navy specifications.

Leading edging of wings, stabilizers, and fins are prepared for painting by hand application of "Alodine," this solution differing somewhat from that used for either the dip or spray process.

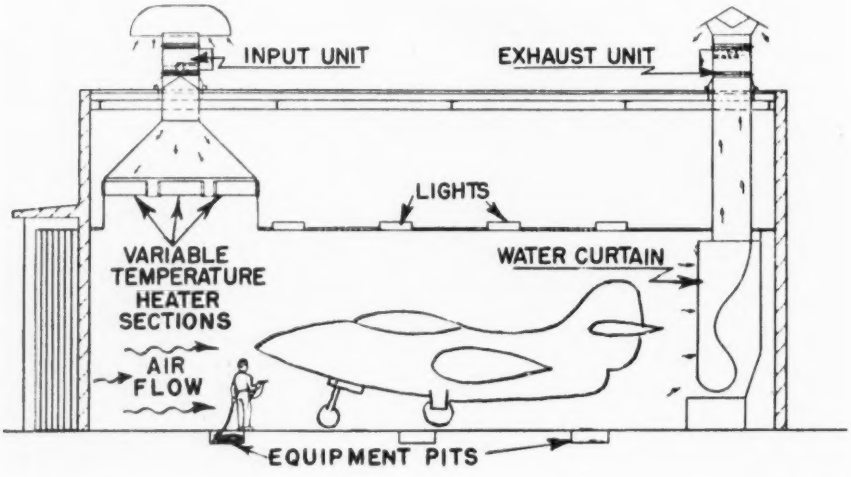
Anodizing

Anodizing is a must for seaplane exteriors, thus differing from the carrier-based Panthers on which chemical coatings (MIL-C-5541), as previously described, are specified.

At Grumman, anodizing is carried out by the chromic acid process in three tanks (see Fig. 5). The anodizing cycle is as follows:

1. Immerse in a 7.5 to 10 per cent (by weight) chromic acid solution for 38 minutes at a current density of 1 to 3 amp./sq. ft. and 40 volts.
2. Seal in hot water maintained at

Fig. 6—Cross-section of Grumman's water-washed spray booth in which large seaplanes, or three fighter planes with wings folded, can be painted at one time.



about 180 deg. F. for 10 to 15 minutes.

3. Dry in a hot air tank. A conventional fan blows steam-heated air through this tank.

The lead-lined anodizing tank has an exhaust duct running along the upper edge to exhaust all fumes.

For greater economy in chromic acid consumption a Permutit Ion Exchanger is used for one of the anodizing installations. The chromic acid is constantly circulated through the exchanger which removes the aluminum and thereby lowers the pH.

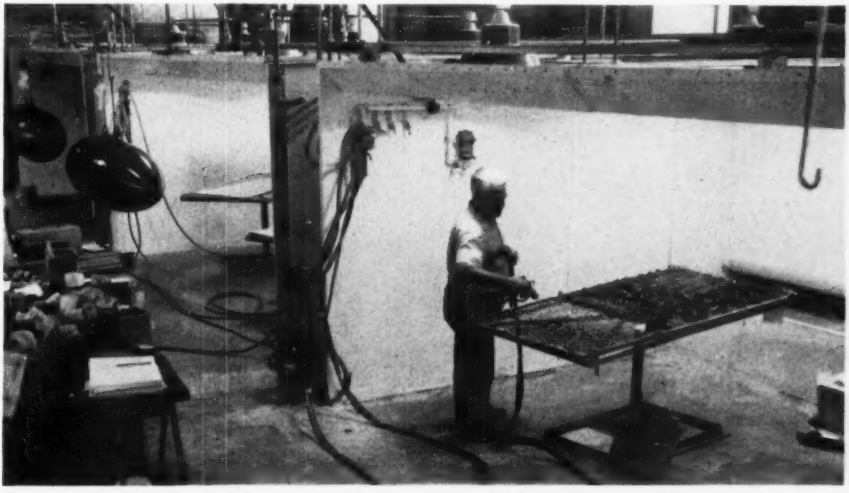
One particularly difficult feature of the Alumilite Hardcoat process is the absolute necessity for keeping the electrolyte cooled down to 50 deg. F. and sometimes at 25 deg. F. for long periods of time. It has been demonstrated that water as a cooling medium in ordinary lead coils is unsatisfactory. Due to the high current density requirements of the process, both water and brine would be most impractical. Freon No. 12 is expanded directly into expansion coils in the anodic tank for controlling the necessarily low temperatures in this high current density Alumilite Hardcoat process. As a result of these factors, an oxide coating thickness of 0.002 inch instead of 0.0002 inch can be obtained.

Calculations of heat transfer, water temperatures, and Btu input showed that the square footage of lead coil cooling area required would leave little tank space for anodizing.

As a matter of fact, these calculations showed that lead coils would weigh about 2700 pounds. They would have to contain 480 lineal feet of lead pipe, and would have to be fabricated in five sections, with separate inlets and outlets hooked into lead pipe manifolds.

Two identical Cupralum lead-clad copper coils were designed, each containing 90 lineal feet of 1⅜-inch O.D.

Fig. 7—One of the many paint installations, installed by Wing Sales and Service, located throughout the Grumman plants. Small parts are painted in the paint booths shown; fuel wingtip tanks may be seen after receiving their final coating. Particular attention is paid to spray booth lighting.



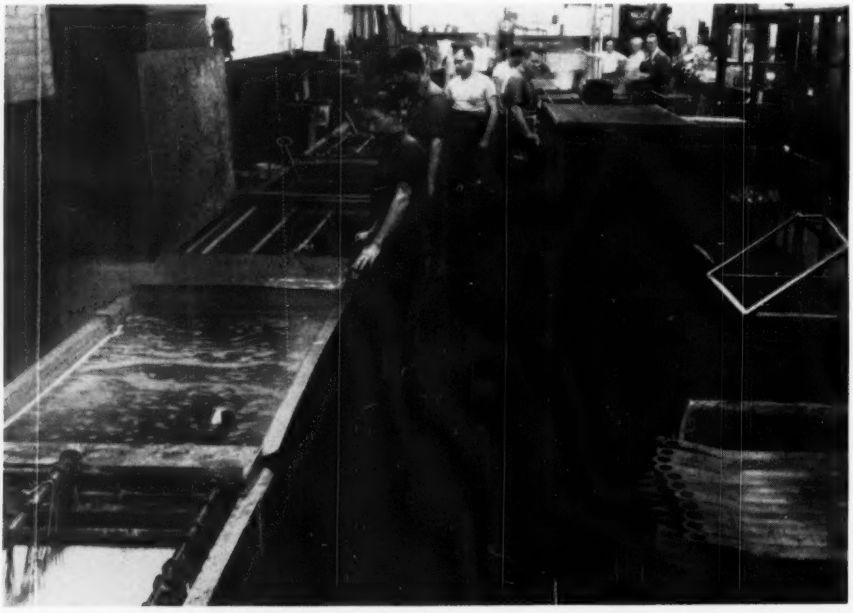
copper tubing with a $\frac{3}{16}$-inch lead cladding. The design provided for suspending the coils by means of three lead clad steel hangers on either side of the tank containing the electrolyte. The overall measurement of each coil was 2 feet high by 7½ feet long. Because of the relatively small footage, they were of the simple return bend type, and projected into the tank 3½ inches. As a result, practically the entire area of the tank was available for process.

The total of 180 feet of Cupralum coil used exceeded the mathematical calculation of square feet of cooling area required. Beyond that, it was decided to provide an oversized compressor, with a constant capacity of 15 tons of refrigeration, together with oversized lines and valves, rather than the 10-ton unit indicated. This compressor was installed on a chassis which would make it possible to step up refrigeration output to as much as 20 tons if necessary.

Freon 12 was selected as the coolant, but if still lower temperatures proved necessary, provision was made to use Freon 22, and thus make available an improvement in cooling temperatures of as much as 30 per cent additional. These procedures resulted in an extremely flexible cooling installation.

Aluminum is now anodized with coatings that require carefully controlled temperature levels. The Cupralum coils have maintained constant temperatures ranging from 50 deg. F. down to 25 deg. F., and have done so with ease. Furthermore, it has not been found necessary to use the oversized capacity of the compressor or

Fig. 8—A view of the plating department showing the line of still tanks for cleaning and plating. Note grating floor—a safety and appearance feature.
(Photos courtesy Grumman Aircraft Engineering Company)



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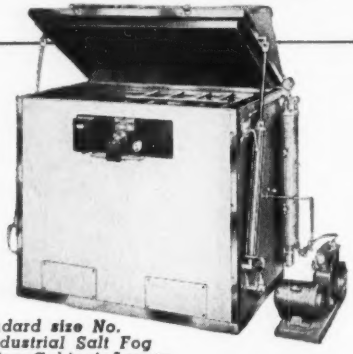

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lines, or to resort to a lower temperature coolant than Freon 12.

Painting

Some of the advantages which caused Grumman to switch from anodizing to dip Alodizing and hence to spray and brush Alodizing are stated by Mr. D. Armstrong, process engineer, to be: "Equivalent corrosion resistance and paint adherence as compared to anodizing; the ability of being able to process complete assemblies, which, although made principally of aluminum, contain cadmium and steel; and, savings in processing time."

Following Alodizing or anodizing, parts are inspected and receive a zinc chromate primer. The primer is applied to both the individual parts and minor sub-assemblies after they are completed. The zinc chromate is applied in the conventional manner with spray guns in small paint booths which are conveniently located along the various assembly lines. The sub-assemblies are still small enough at this stage to allow one man to handle the units on a turntable in the booths.

After the planes are completely assembled, they are rubbed down with a thinner and moved to huge water curtain spray booths. A second primer, which is also of zinc chromate, is applied and the planes are finished by receiving two coats of lacquer with spray guns. Specific government finish specifications which Grumman follows in these operations are:

Lacquer_____AN-L-29
Zinc Chromate Primer_____AN-P-656
Thinner—Dope and Lacquer AN-TFT-256
Thinner—Toluene Substitute_TT-F548

The paint booths, among the largest single water wash booths in existence, handle practically 450,000 cubic feet of air per minute, and maintain a velocity of 200 lineal feet per minute in the breathing zone of the operator. Booths are 160 feet by 20 feet high by 60 feet

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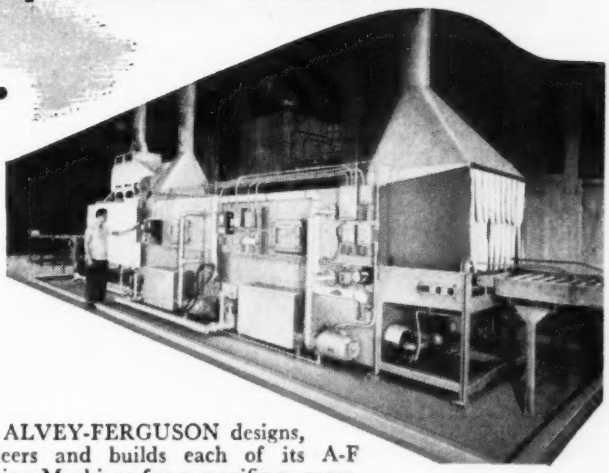

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deep. Air is withdrawn by twelve Wing vertical straight-line exhausters at the rear of the booths, which draw the air with the overspray through the water wall. Twelve Wing belt-driven fans which are located on the roof of the booths deliver the air to twelve banks of three Wing variable temperature heating sections (see Fig. 6). Booths are large enough to accommodate three fighter planes with wings removed or one completely assembled carrier-based bomber.

When two or more of the airplanes are finished at one time, overhead monorail tracks allow a curtain to be pulled between the individual airplanes, thereby preventing overspray from one plane reaching the other. Production records from World War II show that an average of about one plane an hour was painted in these booths.

Minor parts such as wing tanks (see Fig. 7), brackets, flanges, and struts receive their final coats in smaller booths. All these booths also have water curtains. The DeVilbiss spray guns are operated at a fluid pressure of 18 p.s.i. and air pressure of 60 p.s.i.

Plating

Grumman's plating department is at present set up for cadmium plating. It can, however, be readily converted to other plating processes such as zinc plating, which was used during the last war.

Parts that are cadmium plated are electrical brass connections and all steel parts such as arresting hooks, landing gear, guns, engine mounts, bolts, and fittings. Some parts, such as certain types of bolts and nuts, are received partially chromium plated. For these parts an extensive masking job is necessary prior to cadmium plating.

As may be seen from Fig. 8, the majority of equipment consists of still

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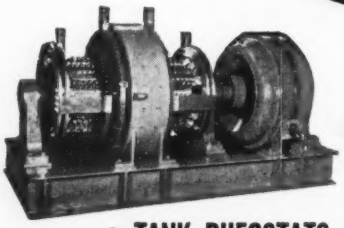

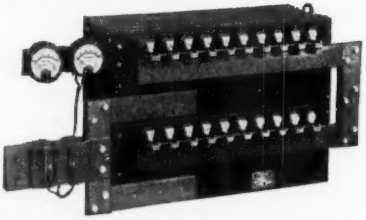

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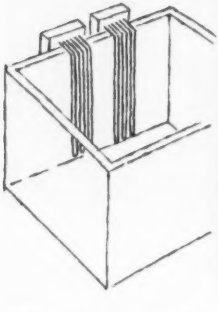

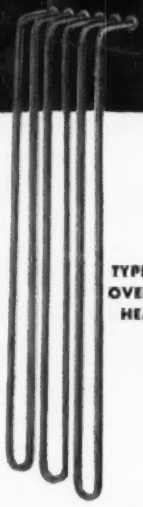

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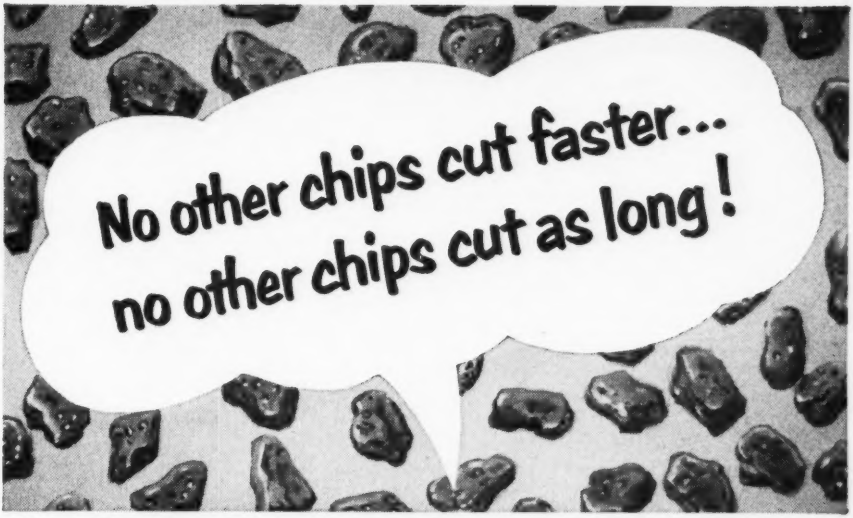
tanks although some plating, for very small parts, is done in Udylite plating barrels. Following are the steps in the cadmium plating process:

1. Clean in 50 per cent (by volume) hydrochloric acid at room temperature for 3-10 minutes to remove all rust.
2. Rinse in water.
3. Clean in a silicate-type alkaline electrolyte at 180 deg. F. and a concentration of 8 oz./gal. The work is made anodic and all smut is removed.
4. Rinse in water.
5. Plate at 3 volts at room temperature and a current density of 2-30 amp./sq. ft. Time varies according to shape of parts.
6. Rinse and dry.

Another operation of the plating department is that of stripping metal that has been Alodized or anodized for rework. Aluminum is treated in a hot solution of "Ridoline" 3192[6], a buffered alkali cleaner, being immersed in the solution for 1 to 3 minutes at a temperature of 180 deg. F. and a concentration of ¾ oz./gal. Following this dip, parts are rinsed and dried. For Dural, a nitric acid bath of 20-25 per cent with about 1 per cent of hydrofluoric acid is used at room temperature. The latter acid may be supplanted by ¼-½ oz./gal. of sodium fluoride or A.C.P. Pickle Bath Toner 103. This treatment removes the natural oxide coating, lowers the surface resistance, ensures good spot welding.

Thus, in these various ways does Grumman, largest manufacturer of carrier-based planes, finish its products to meet the challenge of high speeds and corrosion. No little credit should go to the process engineering personnel, who are agressive, open-minded, and willing to stick with something new till it is tested, proved, and installed.

[6] Reg. Trademark, American Chemical Paint Company.



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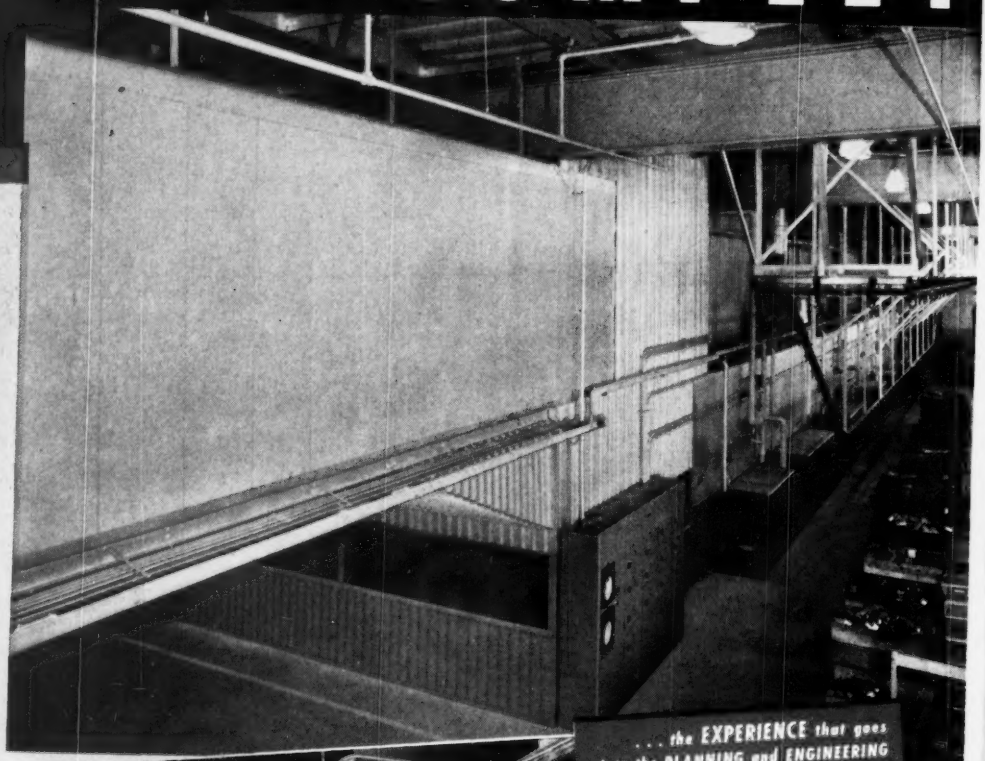

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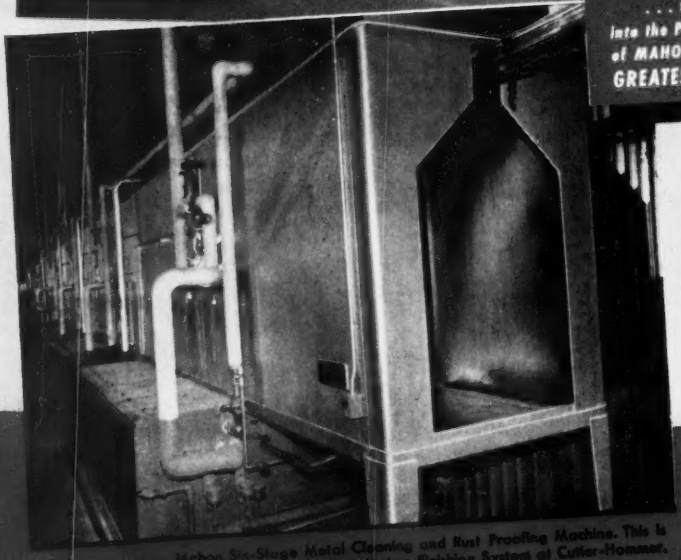

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Above at the extreme right you see Mahon Hydro-Filter Spray Booths installed as part of the Cutler-Hammer Installation. Next to the left, is a Mahon Flow Coating Machine which is part of the same installation. Above, is a high angle view of the Complete Mahon Finishing System at Cutler-Hammer Plant, Milwaukee, Wis. Note the Overhead Drying and Baking Ovens, and the Enclosed Air Conditioned Paint Room Below.

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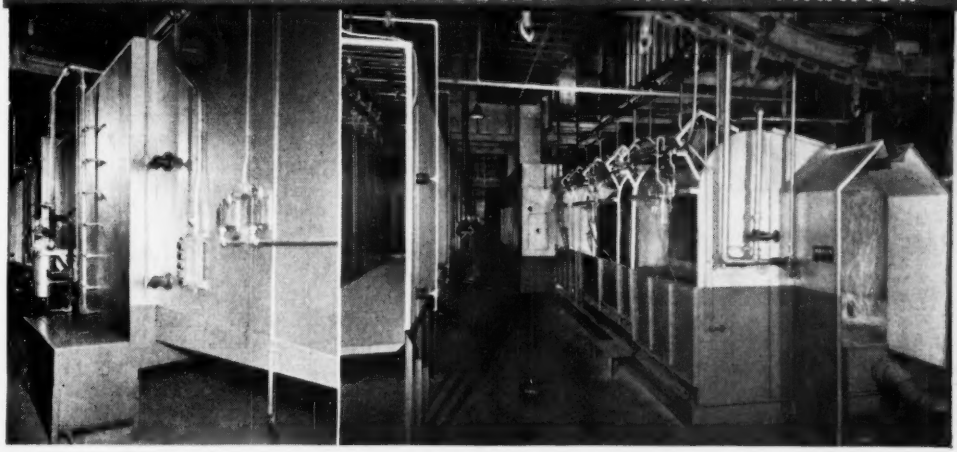

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AHON

Anodizing Aluminum

Dr. Sakae Tajima

Sakae Tajima, a native of Yokohama, attended Tokyo Imperial University where he specialized in electrochemistry. He was awarded the Doctor of Science degree in 1943.

He served as a research engineer in the fields of metal finishing and corrosion at the National Central Aeronautical Research Institute and the National Railway Technical Research Institute, Tokyo. For a time he was a professor in the Metropolitan College of Science and Engineering and in 1948 he joined the Tokyo Metropolitan University in the capacity of head of the Electrochemical Laboratory.

He is the author of some fifty research papers in the fields of metal finishing, corrosion, metal refining, and ion exchange membranes. In 1952 his most recent book, "Electropolishing and Chemical Polishing," was published. He was awarded a National Blue Ribbon medal from the Japanese Government for his contribution to the fundamental study and the popularization of electropolishing in Japan.

Dr. Tajima has served as the editorial secretary of the Electrochemical Society of Japan, and is technical counsellor to the Japanese Electroplating Society, a member of the Board of Trustees of the Metal Finishing Society, and a member of the Electrolytic Refining Committee of the Electrochemical Society.

(Left) A view of Japan's distinctive tourist attraction, Mount Fuji, from one of the high points in the Fuji-Yoshida area.

(Right) The main street of this Japanese town appears to be a direct route to Mount Fuji. (*PRODUCTS FINISHING Staff Photos*)

With Oxalic Acid

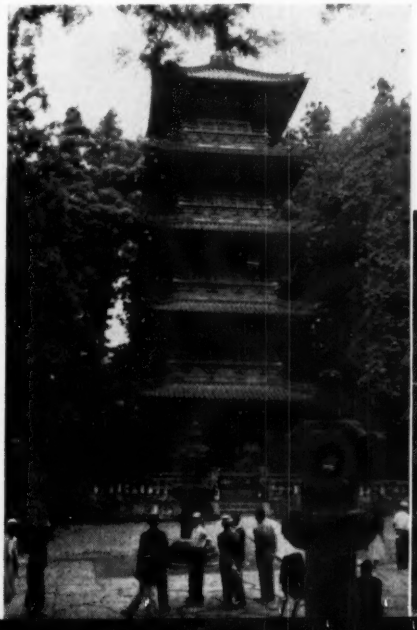
By SAKAE TAJIMA, Sc.D.
Laboratory of Electrochemistry,
Tokyo Metropolitan University

History of the Oxalic Acid Anodizing Process

PF FEATURE

In Japan, the anodizing of aluminum has been used extensively for finishing kitchen utensils, as well as other articles, to improve appearance, corrosion and abrasion resistance. The electrolytes used are mainly oxalic and sulfuric acids; chromic acid is rarely used. The oxalic acid process was developed early (1923) by Kujirai, Ueki, Setoh, and Miyata of the former Institute of Physical and Chemical Research (reorganized as the Institute of Scientific Research, Inc., after World War II). The sulfuric acid anodizing process was not used in Japan until World War II; it was introduced at that time because of the shortage of oxalic acid.

The peculiar anodic phenomenon of aluminum; namely, preventing the flow of electric current, was discovered by Wheatstone (1854) and the idea of manufacturing electric rectifiers and capacitors by utilizing this property was presented by Pollak (1897). Heeren, Buff, Taylor, Mott, Zimmerman, Gunther-Schulze also studied the anodic behavior of aluminum. This is the classical history of researches on the anodic characteristics of aluminum. However,



(Left) The five-story pagoda, or shrine, located at Nikko, Japan.

(Below) The famous Yomiemon gate to the principal shrine at Nikko may be seen in the center background of this photograph. The shrines in this area were first erected approximately 400 years ago.
(Photos by M. Kojima, Tokyo)

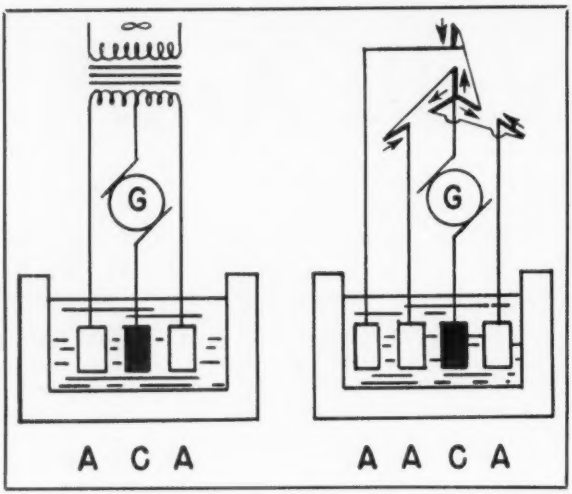


Fig. 1—Shown at left is a sketch of a single phase, a.c. anodizing circuit (right), a diagram for a three phase circuit.

●

these researches were made to study the behavior of aluminum in "solution," and the process we are now interested in makes use of aluminum in the "dried state" with improved corrosion and abrasion resistance, and electrical insulation.

Skinner and Chubb (1914) attempted to obtain a heat-resistant, insulated wire by anodizing aluminum in a Na_2SiO_3 solution applying a high voltage of 300-400 volts, but the film formed under such conditions was too thin and too rough to be applied commercially. However, this is believed to be the first attempt to utilize anodized films in their "dried state."

The late Dr. Tsunetato Kujirai of the Institute of Physical and Chemical Research, Tokyo, was investigating, with the late Mr. Sakae Ueki, a heat-resistant electrical insulator, and there occurred to him the idea of producing oxide films on aluminum wire electrolytically. After many experiments they found that, using oxalic acid, a sufficiently dense film could be produced. Although this process could not be applied commercially to wire for certain reasons, it was found that the process could be used for kitchen utensil fin-

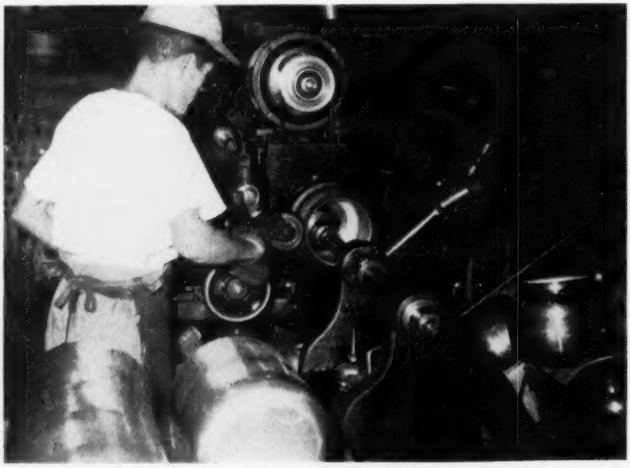


Fig. 2 — One of the forming operations employed in aluminum utensil manufacture. Here, an operator is forming the necks on press-formed tea kettle bodies in the Tokyo plant of Nasu Aluminum Industry Co., Ltd.

●

Fig. 3 — The outside surfaces of formed aluminum pans are tripoli buffed prior to anodizing. This photo was made in the Tokyo plant of Daito Kinzoku K.K.

ishing. Various kinds of electrolytes were effective in producing an anodized film, but the oxalic acid, above all gave excellent results.

Two patents were granted in 1924 claiming anodizing aluminum and its alloys in acids, bases and salts[1] and especially in oxalic acid[2] by applying direct current or alternating current.

In 1924, Bengough and Stuart [3] invented the anodizing of duralumin sheet (for aircraft use) in chromic acid to improve corrosion resistance. This process was patented in England, U. S. A., Germany, but was not patented in Japan, because the Kujirai-Ueki processes had been patented previously. So it was with the sulfuric acid process (Alumilite process) by C. H. Gower[4], Bengston[5] and Tosterud[6].

U. S. Patent 1,735,286 (Nov. 12, 1929) by T. Kujirai and S. Ueki[7], assigned to Rikagaku Kenkyujo (Institute of Physical and Chemical Research), claims that oxalic and malonic acids or their salts can be used to produce an oxide coating on aluminum.

Examples are:

1. Oxalic acid, 1.0-3.0 per cent

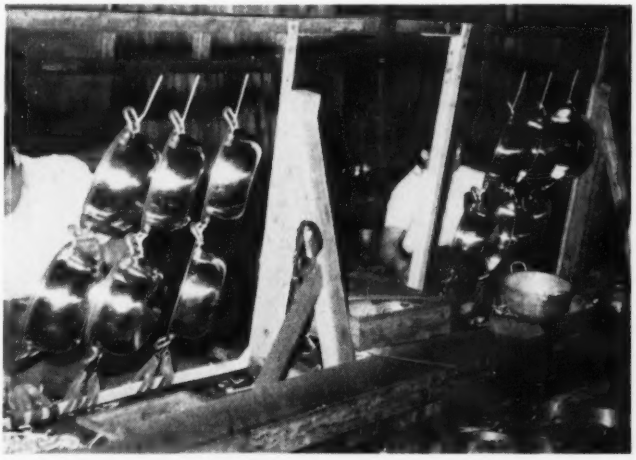


Fig. 4—Cleaned pans are racked for anodizing. Main rack frames are wood with aluminum support strips. Copper strips above the solution surface carry current from bus bars along tank sides. (Daito Kinzoku K.K.). Note rubber bands used to secure hook tension and a good electrical contact between the aluminum wire hooks and copper bar.

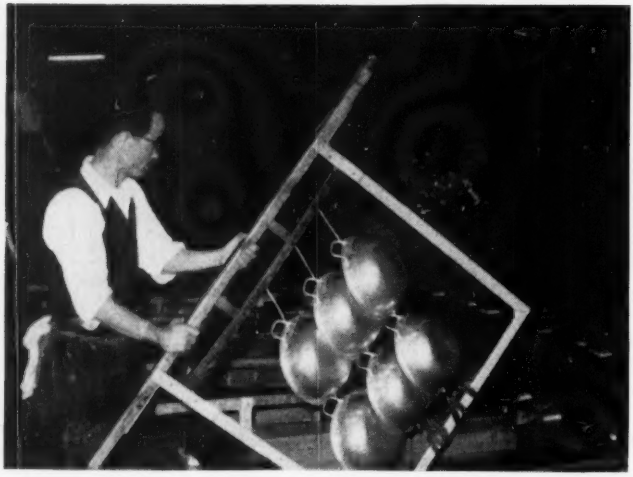


Fig. 5—A rack of anodized pans is removed from the anodizing tank (Daito Kinzoku K.K.).

60-100 volts alternating or direct current.
Current density, 0.45-0.27 amp./sq. dm.
Temperature, under 86 deg. F.

2. Malonic acid, 1.0-3.0 per cent
60-100 volts alternating or direct current.
Current density, 0.45-0.27 amp./sq. dm.
Temperature, under 86 deg. F.

The claim is also made that in electrolysis of any other solution composition, it is not possible to build up the anodic film to any desired thickness, but that it can be done in either of the two electrolytes given.

Although the dense film could be produced by direct current, usually local pitting on the aluminum surface appeared, probably due to the local concentration of oxalate ions. To prevent this local attack, superimposing of alternating current on direct current was invented.

U. S. Patent 1,735,509 (Nov. 12, 1929) by Shoji Setoh (the successor of the research laboratory of Dr. Kujirai) and Sakae Ueki[8] assigned to Rikagaku Kenkyujo (the Institute of Physical and Chemical Research Tokyo) claims that the anodizing can be done in a solution of oxalic acid as follows: Oxalic acid — 1.3 per cent
Direct Current, 6-90 volts, upon which is superimposed alternating current, 60-120 volts.
Current density 0.45-1.8 amp./sq. dm.

In 1928, a small scale pilot plant was installed in the Institute of Physical and Chemical Research to produce anodized articles commercially. Although the films thus produced are dense and can be dyed if desired, the corrosion resistance is not necessarily satisfactory because a dense film is a porous film which permits the passage of electric current.

In order to secure a dense and at the same time a corrosion-resistant film, Setoh and his collaborator, Akira Miyata, found, by chance, the steam sealing method (1928). Using this process, the anodized article is rinsed in water and kept in an autoclave of 55-70 p.s.i. dried steam for about 20-30 minutes. By this treatment, the film becomes somewhat yellowish and increases in transparency. The electrical insulating power increases by 50 per cent, and above all, the extreme corrosion resistance is secured as described later.

This invention was an epoch-making one in our anodizing industry and the process was named the "Alumite"

process. The term "Alumite" is now widely used in Japan for aluminum anodizing regardless of the process employed.

Considering that a British patent [9] was granted for hot water sealing in 1934, the steam sealing method may be said to be quite an original one.

In 1929 the World Engineering Congress was held in Tokyo, and Setoh and Miyata [10] presented a paper, "Electrolytic Oxidation of Aluminum and its Industrial Application", describing the status of aluminum anodizing with steam sealing at that time. They forwarded to the foreign participants an anodized and sealed set-square as a gift. For this reason, the sealing method was not patented in foreign countries, it is said.

Suggested by this paper, the Vereinigte Aluminum Werke A. G. with Langbein-Pfanhauser Werke A. G. and Siemens & Halske A. G. started an intensive research and developed the so-called "Eloxal" process using oxalic acid with some additions.[11] Now the term "Alumite" in Japan, "Alumilite" in U. S. A., and "Eloxal" in Germany are the common names for aluminum anodizing in each country.

In Japan, oxalic acid anodizing has been done mainly by superimposing a.c. on d.c. and the resulting anodized color is yellowish gold. The reason of the extreme popularization of anodizing for kitchen utensils in Japan is, in the author's opinion, as follows:

(1) The development of anodizing process just kept pace with the production and popularization of aluminum articles.

(2) The anodized color produced on aluminum by the oxalic acid process was to the liking of the Japanese people at large, with

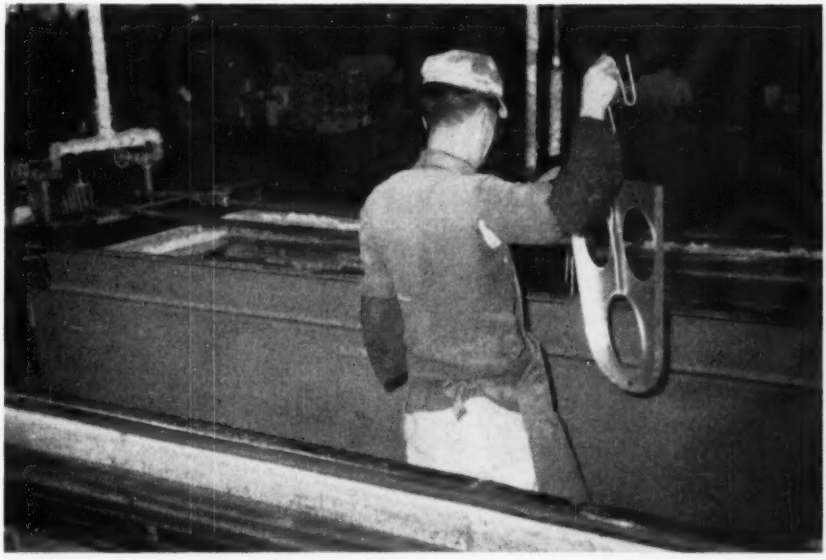


Fig. 6—Anodizing aluminum alloy aircraft parts in 3 per cent oxalic acid held at room temperature by circulating water through a water jacket built around the tank. The tank shown is steel, lead lined. Alternating current (100 volts) is employed, and parts to be anodized are hung on both bus bars; hence no cathodes are required.

Fig. 7—Anodized lunch boxes and covers are loaded into a bamboo basket for immersion in a hot solution of Japanese tea for dyeing to the desired yellow color (Nihon Alumilite Co., Tokyo).

timely propaganda of the manufacturer, in addition to its improved properties of hardness, corrosion and abrsion resistance.

(3) Anodizing processes were monopolized by the Institute of Physical and Chemical Research, and the oxalic acid process was used exclusively.

Fig. 8—Dyed articles are steam sealed at 70 p.s.i. for 30 minutes in this autoclave in the Nihon Alumilite plant.

Fig. 9—A high gloss is imparted to anodized, dyed, and steam-sealed aluminum surfaces by color buffing (loose buffs) with a lime buffing compound (Daito Kinzoku K.K.).

●

(4) People at large have come to be accustomed to its color and they never think of aluminum articles but of the "Alumite" color.

The patents expired in 1943, and many anodizing shops started after the War adopted the sulfuric acid anodizing process on account of the high cost of oxalic acid and higher electric power consumption of the process. However, to comply with the desires of

Fig. 10—View of a typical Japanese housewares store, with the merchandise stacked right out on the sidewalk in front of the "frontless" shop. (*PRODUCTS FINISHING Staff Photos*).

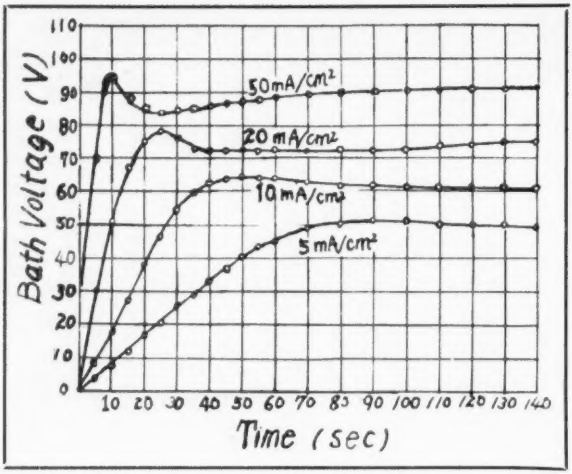


Fig. 11 — Change of bath voltage with time at fixed current densities for 2 per cent oxalic acid at 7 deg. C.

the people, a similar color is obtained by dipping anodized articles in a hot saturated solution of Japanese tea. But the tea dyeing, it is said, degrades the quality of the film, and the oxalic acid anodizing and steam sealing is now recovering its former popularity. The process is especially indispensable for electrical insulation.

Oxalic Acid Anodizing Process

Some conception of the oxalic acid process, as performed commercially, may be gained from the brief description which follows.

Tank: Lead-lined or asphalt-lined tank with water cooling pipe in the tank. Sometimes the electrolyte is circulated and cooled outside the tank.

Electrolyte: Oxalic acid 3 per cent (1-5 per cent).

Cathode: Graphite or lead.

Voltage: 60-100 volt a.c. is often applied. But the superimposing of d.c. and a.c. is more commonly employed, whereby d.c. voltage is 15-30 volts and a.c. voltage is 60-100 volts. The circuits for single phase and three phase a.c. are illustrated in Fig. 1.

Current Density: 10-20 amp./sq. ft.

Time of Electrolysis: 30-40 minutes.

Temperature: 75 to 95 deg. F.

Steam sealing: 70 p.s.i. steam for 30-60 minutes.

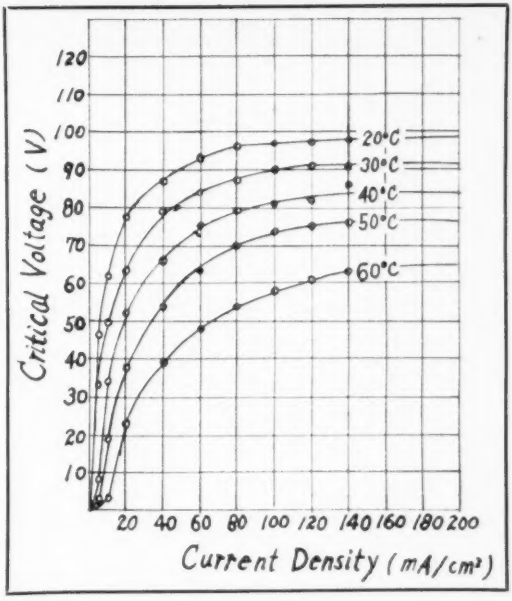
Various preliminary operations are performed according to the conditions of the surfaces to be treated, and to

Table I

TOTAL ELECTRIC QUANTITY TO REACH THE MAXIMUM VOLTAGE

Current Density mA/cm²	Time Seconds	Total Electric Quantity Coulomb/cm²
1.0	600	0.60
2.0	300	0.60
5.0	100	0.50
10.0	50	0.50
20.0	25	0.50
50.0	10	0.50
100.0	7	0.70
200.0	4	0.80

Fig. 13—Critical maximum voltage plotted against current density for various temperatures in 2 per cent oxalic acid.



the end use of the articles. Buffing, degreasing in hot, mild, alkaline cleaner or dilute sulfuric acid, dipping in nitric acid to eliminate the insoluble constituents such as copper, iron, and so on, and to neutralize the alkali, are some of the usual preparatory treatments. Dipping in nitric-sulfuric, nitric-phosphoric, or nitric-hydrofluoric acid mixtures to secure semi-bright or brilliant surfaces is employed in certain cases. Following the preliminary treatments of cleaning and bright dipping, the articles are anodized, rinsed in water, dyed in some cases, and finally sealed in high pressure steam. The steam sealing process improves the transparency, corrosion resistance, electrical-insulating quality and hardness of the surface film. Completed products are usually buffed with lime buffing compound (or colored) to secure a high gloss which enhances their sales appeal (see Figures 2 through 10).

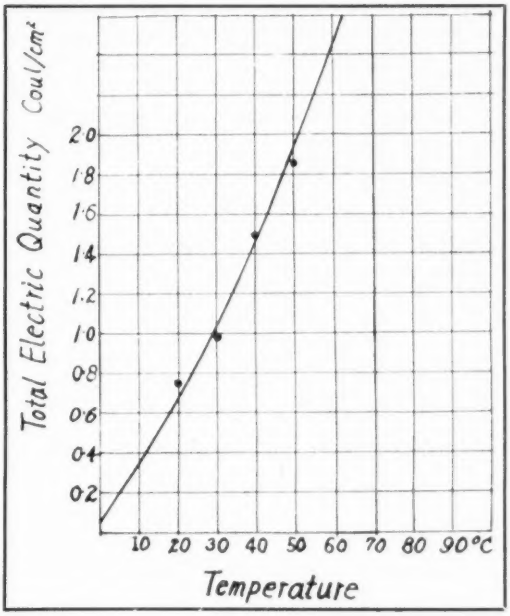


Fig. 12—Variation of total electric quantity with temperature for 2 per cent oxalic acid.

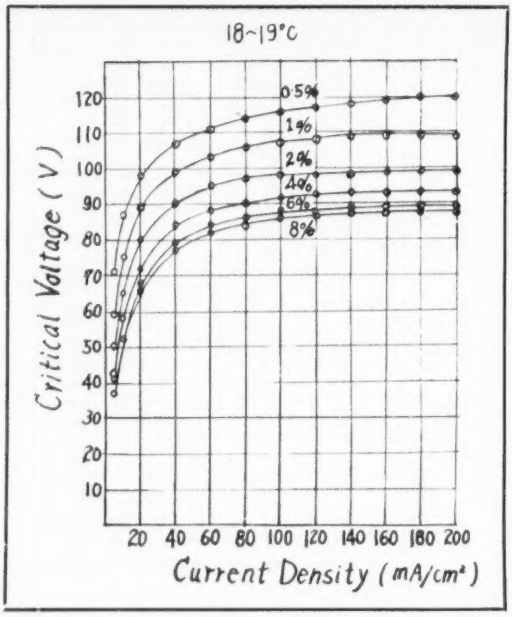


Fig. 14 — Critical voltage plotted against current density for various acid concentrations.

time, when current density is kept constant (5, 10, 20, 50 mA/ cm^2), are shown for 2 per cent oxalic acid at 7 deg. C. (44.6 deg. F.) in Fig. 11. The voltage rises steeply at the start, reaches a maximum value, and then decreases slightly and maintains nearly constant value even during 2-3 hours' electrolysis. It is to be noticed that the products of current density and time required to reach the maximum voltage (Total Electric quantity, A/ cm^2 x seconds) are nearly constant (about 0.5 coulomb in this case) over a fairly wide range of current density, as shown in Table I.

Characteristics of Oxalic Acid Films

The anodic behavior of aluminum and properties of anodic films will be described and illustrated graphically.

The changes of bath voltage with

The total electric quantity varies with the concentration and tempera-

Table II

MICRO-VICKERS HARDNESS OF OXALIC ACID FILMS

Sample No.		A	B	C	D	E	F
Thickness	Theoretical	0	4.0	8.0	16	32	65
	Observed	0 (Non-anodized)	3.0	6.5	9.3	19.0	41.6
HV	200 gm.	47.8	51.4	47.9	78.5	96.2	425
	Load 100	45.8	60.0	77.2	478	393	360
	50	44.5	68.0	85.0	401	401	....

Table III

HARDNESS OF SOME METALS

Metal	Micro-Vickers Hardness (load)	Vickers Hardness (load 10kg.)
Aluminum sheet	47.8(200 gm.)	46.1
Gun Metal		
Cu 88 Sn 10 Pb 2	120(200 gm.)	110
Carbon steel (C = 0.87)		
quenched in water	772(500 gm.)	761
annealed	233(200 gm.)	242

ture of the solution. Figure 12 shows the change of total electric quantity with temperature in 2 per cent oxalic acid.

When the anode is taken from the bath at the maximum voltage, the surface is covered with a very thin film with interference color. It is concluded that the maximum voltage and the total electric quantity were required to form this thin film and, after its formation, only relatively lower voltage is necessary to build up a dense film. Figure 13 shows the relationship between the critical maximum voltages and current densities for various temperatures in 2 per cent oxalic acid. Figure 14 shows the relationship of the critical voltage and concentration of the acid at 18-19 deg. C. (65 deg. F.).

It is thus understood that the critical voltage is lower at higher tem-

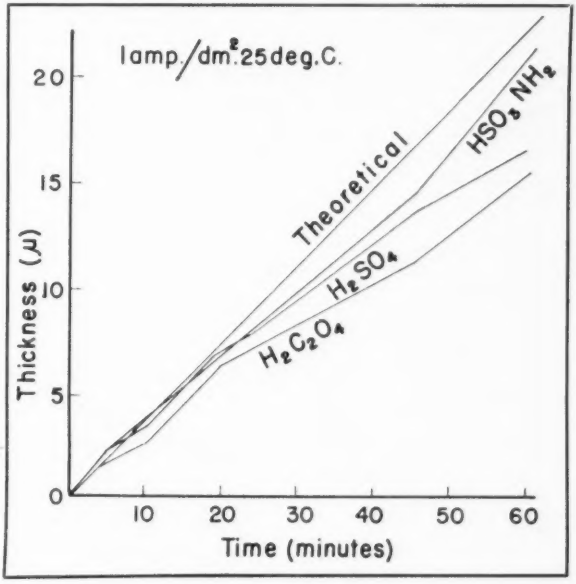


Fig. 15—A comparison of film thicknesses produced in several solutions, and time of anodizing with direct current. (*Courtesy Electrochemical Society, Japan*).

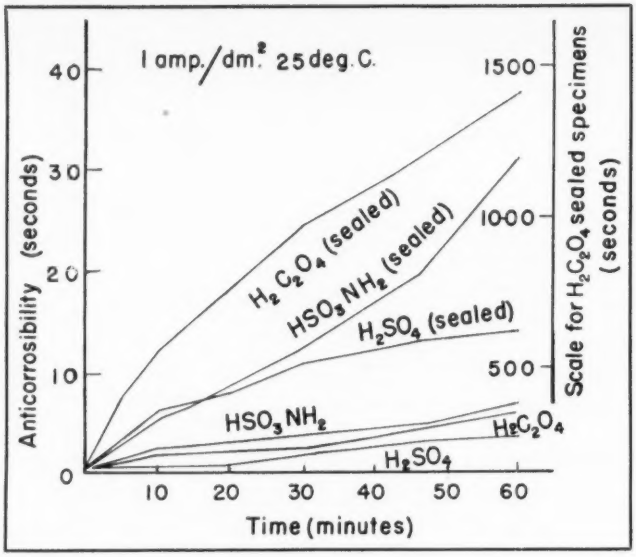


Fig. 17 — An evaluation of the resistance of anodized films (d.c. used) to corrosion. *(Courtesy Electrochemical Society, Japan).*

peratures and higher concentrations, but the film formed is apt to dissolve in the solution under these conditions.

As noted previously, oxalic acid anodizing by straight direct current sometimes causes a local attack on aluminum due to the accumulation of oxalate ion. The superimposing of alternating current on direct current improves this condition.[8]

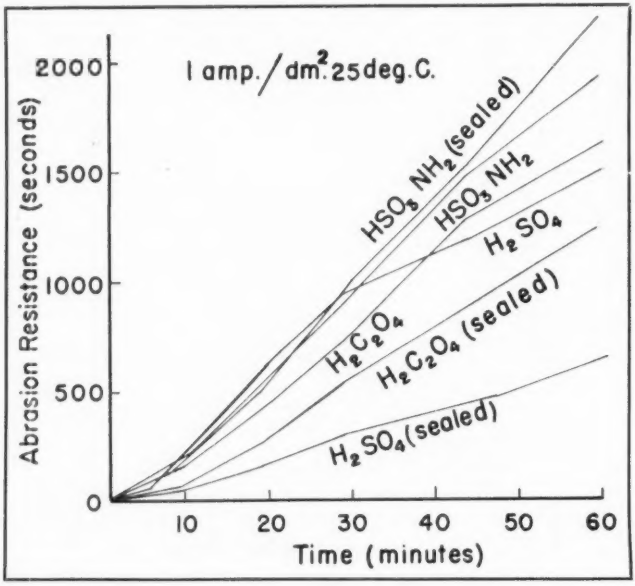


Fig. 16—Abrasion resistance of various films formed using direct current. *(Courtesy Electrochemical Society, Japan).*

Hardness of oxalic acid films measured by Micro-Vickers Hardness Tester is shown in Table II. The anodizing conditions is as follows:

Electrolyte: Oxalic acid, 2 per cent solution.

Temperature: 12 deg. C. (53.6 deg. F.)

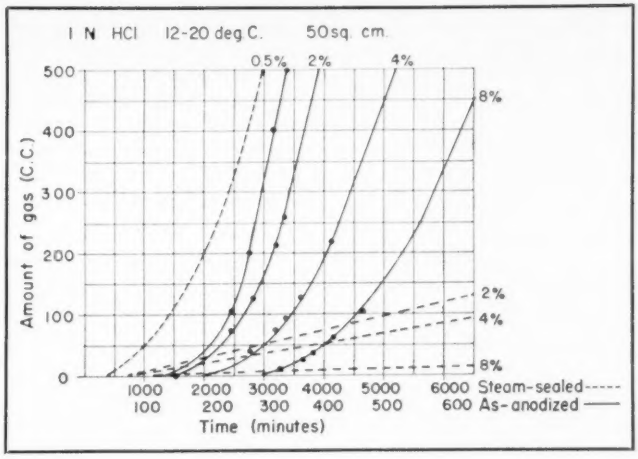


Fig. 18 — Corrosion tests of anodized film (oxalic acid) in 1 N HCl.
(Courtesy Electrochemical Society, Japan).

Current Density: 1 A/dm² (10 amp./sq. ft.) d.c.
Electrode distance: 14 cm.
Agitation by air
Aluminum sheet 0.5 mm. thick, 99.7 per cent, Si. 0.18, Fe 0.13, Cu trace.

For comparison, the Vickers Hardness of certain metals are shown in Table III.

A comparison of sulfuric, sulfamic and oxalic acid films was made by the author[14] under the following conditions:

Sulfuric acid: 15 per cent by vol.
Sulfamic acid: 7.5 per cent by wt.
Oxalic acid: 2 per cent by wt.
Current Density: 1 A/dm², (10 amp./sq. ft.) d.c.
Temperature: 25 deg. C. (77 deg. F.)

The average bath voltage was by far the lowest with the sulfuric acid bath; the voltages in the oxalic and sulfamic acid baths being slightly higher. The degree of increase of bath voltage after 60 minutes anodizing was below 1 volt with sulfuric and oxalic acids, but with sulfamic acid, it was above 15 volts. Hence the denser and more compact film was assumed to be formed in the sulfamic acid bath.

The thickness, abrasion resistance and corrosion resistance of anodized

Table IV

SOME PHYSICAL CONSTANTS OF OXALIC ACID FILMS

	as-anodized	steam-sealed
Electrical Insulation	10 KV/mm.	15 KV/mm.
Refractive Index	1.64	1.58-1.59
Dielectric Constant	7.7	10

films were determined by the methods adopted by the specification of the Japan Industrial Standard (JIS).

Thickness was determined by direct measurement of the section of specimen with a metallurgical microscope and ocular microscale.

Abrasion resistance was determined by measurement of the time (seconds) required to wear off the film with carborundum particles (80 mesh) falling upon a specimen from 1000 mm. height (falling weight 320 gm.).

Anticorrosibility was measured as the time (seconds) required to remove the film with a 10 per cent solution of NaOH at 35 deg. C. (95 deg. F.) dropped on a specimen. Using a constant

Table V

SPECIFICATIONS OF ANODIZED FILM

(A) Oxalic Acid Films.

Grade	Special Grade	1st Grade	2nd Grade
Thickness (μ)	14	9	6
Abrasion resistance (seconds)	1,100	500	150
Corrosion resistance (seconds)	230	140	90
Mark	As	A1	A2

(B) Sulfuric Acid (and other) Films.

Grade	Special Grade	1st Grade	2nd Grade
Thickness (μ)	14	9	6
Abrasion resistance (seconds)	470	230	100
Corrosion resistance (seconds)	75	50	30
Mark	B_s	B_1	B_2

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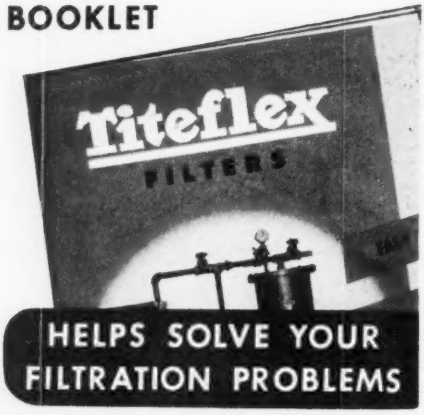

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anodizing time, the sulfamic acid films formed were thickest; sulfuric and oxalic acid films followed, as shown in Figure 15.

In abrasion resistance the oxalic acid film ranks between sulfamic and sulfuric acid films, and by steam-sealing under 5 kg./cm^2 (70 p.s.i.) steam for 35 minutes, it was lowered as shown in Figure 16.

Corrosion resistance of anodized film is shown in Figure 17. Sulfamic acid films were highest and oxalic and sulfuric acid films followed. Steam-sealing was effective in improving the corrosion resistance of oxalic acid films, and excellent corrosion resistance was thus attained.

Corrosion tests[12] of oxalic acid film in 1N HCl are shown in Fig. 18, whereby the anodizing was done under the following conditions:

Oxalic acid: 0.5, 2, 4, and 8 per cent.
Voltage: 60 volts, d.c.
Current Density: 20 mA/cm^2.
Time of Electrolysis: 1 hour.
Anode area: 50 cm^2.

It will be understood that the corrosion resistance is higher in concentrated solutions, and steam-sealing is very effective in improving corrosion resistance.

Required anodizing time to get sufficient affinity to dyestuff (Roccelin Acid and Direct Black[14] was as follows:

Sulfuric acid bath: 30 minutes.
Oxalic acid bath: 45 minutes.
Sulfamic acid bath: 60 minutes.

By steam treatment, the as-anodized film (gamma-alumina) transforms to a Böhmit-like compound ($Al_2O_3 \cdot H_2O$) and seals the pores. The electrical insulating power, refractive index, and dielectric constant change as shown in Table IV.

The Japan Industrial Standard (JIS) specifies the thickness, abrasion resistance and corrosion resistance of anodized film as shown in Table V.

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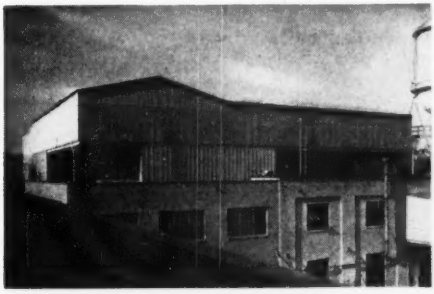

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ACKNOWLEDGMENT

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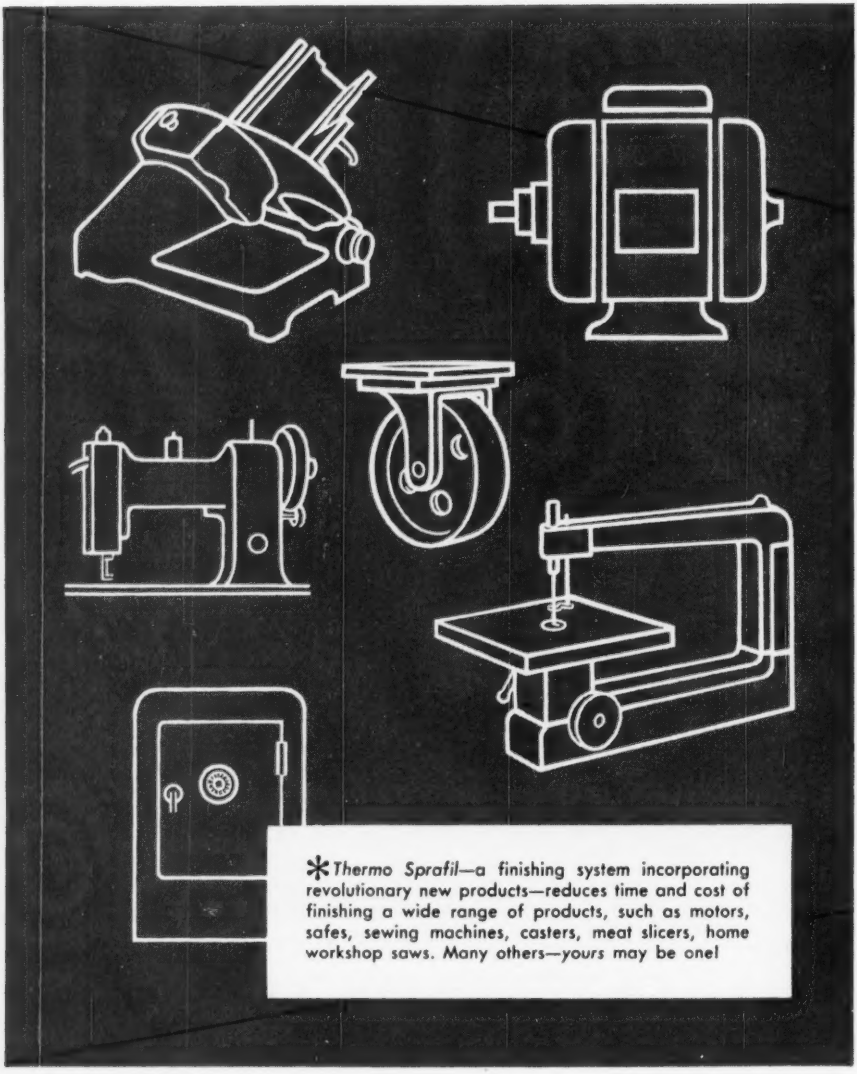

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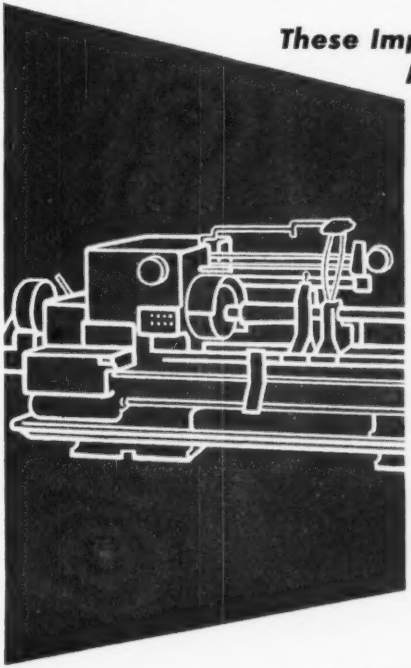

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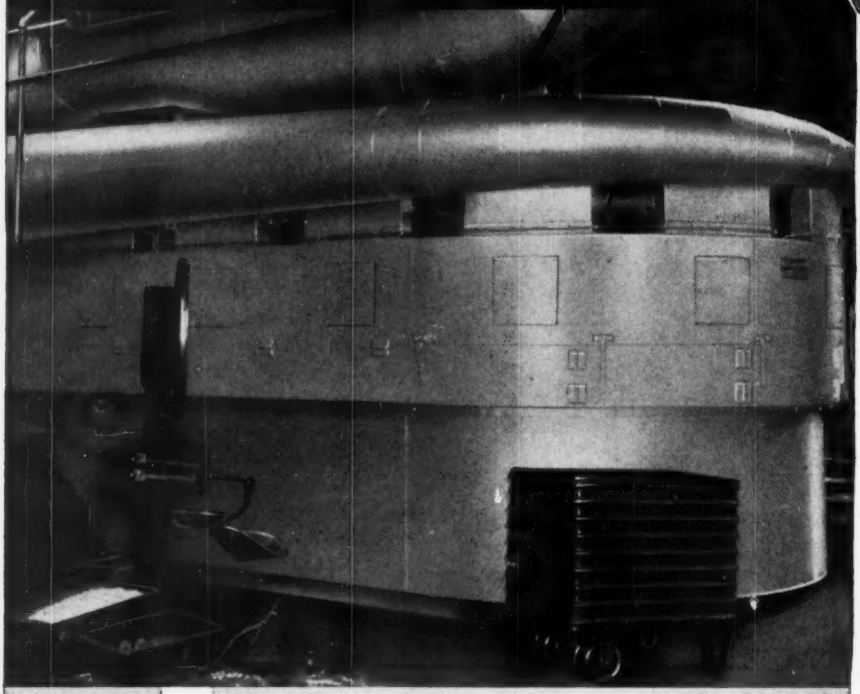

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Analyze Finish Application Troubles

by DR. ALLEN G. GRAY

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[1] Sherwin-Williams Company Brochure CFP-513—"Common Problems in Product Finishing."

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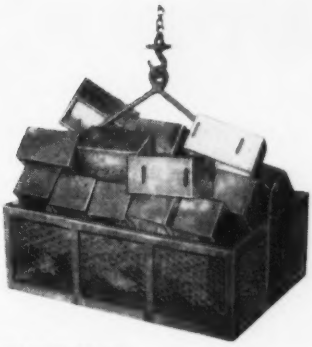

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– is interchangeable with the standard NesTier shop box – and performs many extra functions.

The NesTier Basket, built to standard NesTier dimensions, can be transported by roller and overhead conveyors, on pallets and skids – can be carried easily by hand.

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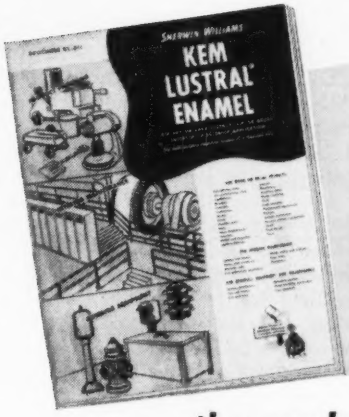
Rossmoyne, Ohio Metal Specialties Division

ducer is added too fast without sufficient stirring, breaking may result. Break may occur if finishing material is subjected to extremes of either heat or cold; for best results material should be kept at a temperature of 70 to 75 deg. F. Natural oxidation of the material, if allowed to remain open in the air over a period of time, may cause break. Addition of proper amounts of solvent, plus infusion of fresh material, will put the batch into condition if oxidation has not proceeded too far. It is usually good practice to choose a reducer of greater solvent strength than originally recommended.

Smoothness of Coat

Defects in smoothness of films applied on the finishing line are objectionable because they detract from the decorative quality of the finish. Sagging of the finish may be caused by either over-reduction or by use of too slow a solvent. The application of too heavy a coat or uneven distribution of the spray coating may give sagging troubles. If sags and runs are due to too much material applied on the surface, fluid pressure to the spray gun should be cut down or operating speed increased. If spray gun is tilted at an angle, more material is supplied where pattern is closest to the surface. Streaks may also be caused by tipping the spray gun, in which case one side of the pattern hits surface from shorter distance causing more material to be applied at this point. A dirty air cap or fluid tip may cause a heavy top or bottom pattern. "Split spray" will cause more material to be applied at top or bottom of pattern. To correct this condition, fluid pressure should be increased or width of spray decreased.

If the finish is applied in strong sunlight the result may be top drying followed by slippage of film on vertical surfaces. On the other hand, lack of flow of finish material may be due to:



AIR-DRY OR BAKE

SPRAY, DIP OR BRUSH

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Here's the versatile finishing material industrial users asked for—KEM LUSTRAL—*one* top-quality enamel that gives you all these advantages . . . and more—

—will air-dry or bake

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—has outstanding durability, gloss retention and weather resistance—interior or exterior

—does double-duty as a product finish or for maintenance painting

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KEM LUSTRAL is one of a complete line of industrial quality product finishes available through Sherwin-Williams Branches in all principal cities. Consult your classified telephone directory for location of Branch nearest you. Ask for a copy of KEM LUSTRAL Brochure KL-511. Or write The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio.

Services of trained industrial finish specialists available in your area through nearest Branch

Your "on-the-spot" source for PRODUCT FINISHES

SHERWIN-WILLIAMS

INDUSTRIAL FINISHES

insufficient reduction; use of solvent with too fast an evaporation rate; improper atomization of spray gun; and application of too thin a film.

Orange Peel

The presence in a spray lacquer of large proportions of extra fast evaporating solvents may lead to blushing in humid weather, and to orange peel as a result of poor flow. The degree of this orange peel type of defect depends greatly on the speed of evaporation of the volatiles because the spray application deposits the lacquer on the surface in the form of small globules, and the sprayed material must be kept fluid for a sufficient time to allow these globules to flow together into a continuous, smooth film. Lacquers containing large proportions of rapidly evaporating solvents dry up too rapidly to allow this "flowing-together" process to complete itself. Commercial lacquers generally contain a mixture of both the slowly evaporating flow-producing materials and fast evaporating materials. Common causes of orange peel and other spray finishing defects are summarized in Table I.

The atmospheric temperature at the time the lacquer is applied may influence the smoothness of the finish, since the evaporation rate of volatiles increases[2] about 50 per cent by a rise in temperature of only 18 deg. F. Thus, a finishing composition in which the volatiles are only just good enough under winter conditions of application may give films of considerable orange peel under summer conditions.

Spray Gun Technique

Understanding a few basic rules of spray painting can improve quality and avoid numerous finishing troubles.

[2] "Paint and Varnish Technology"—Edited by Wm. von Fisher, Reinhold Publishing Corp., New York.

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HOT Lacquer NEWS

PUBLISHED PERIODICALLY BY HERCULES POWDER COMPANY IN THE INTERESTS OF BETTER FINISHES AND FINISHING

Wurlitzer Piano Finishing Rate Up 33% with Hot-Spray Lacquer

Quality Finish Also Cuts Rubbing and Handling Time

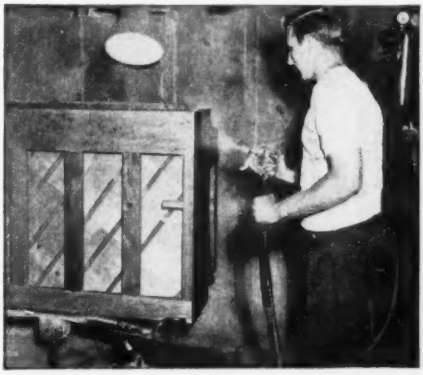
Before specifying hot lacquer, the finishing department in the Rudolph Wurlitzer piano factory at DeKalb, Illinois, put out 160 pianos in a 12-hour day. Since switching to the hot-spray process, the same number of pianos are now finished in a normal 8-hour day. Hot lacquer not only gives the famous Wurlitzer a better finish with fewer rejects, but also reduces application time. Because a piano is a large item, this faster finishing alleviates a floor space problem in the bargain!

Cellulose Products Department

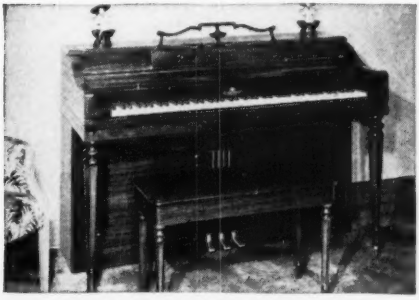
HERCULES POWDER COMPANY

INCORPORATED

927 Market Street, Wilmington 99, Del.



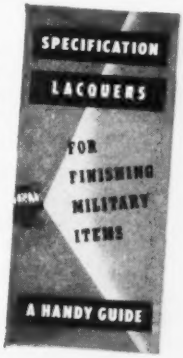
After case parts of the piano are assembled, final coats of hot gloss lacquer are applied.



Completed upright with hot lacquer finish.

Specification Lacquers for Finishing Military Items

Learn more about lacquer for defense finishing. Send for this handy guide to specification lacquers that helps you decide which finish you will need in performing government contracts. Specification numbers are listed, as well as an index to uses.



CL52-6

Hercules does not make lacquers or equipment, only the ingredients from which lacquers are made.

Table I

SOME SPRAY PAINTING TROUBLES AND REMEDIES

TROUBLE	POSSIBLE CAUSES	SUGGESTED REMEDIES
SAGS	1. Dirty air cap and fluid tip.	1. Remove and clean cap and tip.
	2. Gun stroked too close to surface.	2. Stroke 6-10 inches from surface.
	3. Trigger not released at end of stroke.	3. Release trigger after every stroke.
	4. Gun stroked at wrong angle to surface.	4. Gun should be stroked at right angles to surface.
	5. Paint too cold.	5. Use an approved paint heater.
	6. Paint applied too heavy.	6. Calculate depth of wet film.
STREAKS	1. Dirty air cap and fluid tip.	1. Remove and clean cap and tip.
	2. Insufficient or incorrect overlapping of strokes.	2. Follow the previous stroke accurately. Deposit a wet coat.
	3. Gun stroked too rapidly.	3. Take deliberate slow stroke.
	4. Gun stroked at wrong angle to surface.	4. Gun should be stroked at right angles to surface.
	5. Stroking too far from surface.	5. Stroke 6-10 inches from surface.
	6. Too much air pressure.	6. Use minimum air pressure needed.
	7. Split spray.	7. Clean fluid tip and air cap.
	8. Paint too cold.	8. Heat paint to get good flowout.
ORANGE-PEEL	1. Paint not thinned out sufficiently.	1. Add correct amount of solvent by measure.
	2. Paint too cold.	2. Heat to get good flowout.
	3. Not depositing a wet coat.	3. Check solvent. Use correct speed and overlap of stroke.
	4. Gun stroked too rapidly.	4. Take deliberate slow stroke.
	5. Insufficient air pressure.	5. Increase air pressure or reduce fluid pressure.
	6. Using wrong air cap or nozzle.	6. Select correct air cap and nozzle for material and feed.
	7. Gun stroked too far from surface.	7. Stroke 6-10 inches from surface.
	8. Overspray striking a previously sprayed surface.	8. Spray detail parts first. End with a wet coat.
EXCESSIVE PAINT LOSS	1. Not triggering at each stroke.	1. Release trigger after stroke.
	2. Stroking at wrong angle.	2. Stroke at right angle to surface.
	3. Stroking too far from surface.	3. Stroke 6-10 inches from surface.
	4. Wrong air cap or fluid tip.	4. Use correct setup.
	5. Depositing paint film of irregular thickness.	5. Make it a practice to calculate the depth of wet film.
	6. Fluid pressure too high.	6. Reduce pressure. If pressure keeps climbing, clean regulator on pressure tank.
	7. Air pressure too high.	7. Use minimum air needed.

(Adapted from data made available by Bede Products, Inc.)

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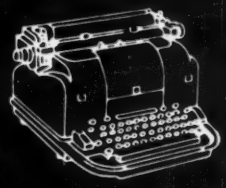

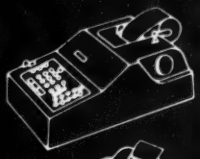

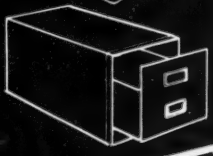

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More than 60% of Randolph's output is specifically formulated for individual customers. Tell us what you want—and be sure to get a finish that will show and keep your product at its best!

Write for our brochure "P" on office equipment finishes. We will be glad to send it to you—free. Consult us if you have any finishing problems.

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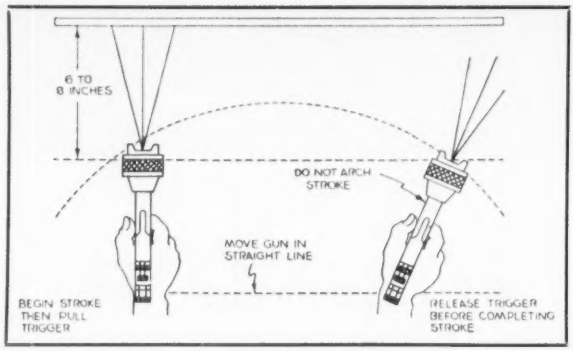

Fig. 1 — Diagram showing proper method of making a spray gun stroke. Gun is triggered at both start and finish of stroke. Gun should move in a straight line and stroke should not be arched. *(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)*

One of the most elementary factors that should be understood is the proper method of spray painting a flat surface. Figures 1 and 2 illustrate the two most important factors to watch. The proper method of making a spray gun stroke is to avoid swinging the spray gun in an arc. It is perhaps natural for an inexperienced operator to wave the gun as he sprays. This is undesirable because arcing the gun turns it directly off the target, especially at the ends of the stroke.

Another thing wrong with the arc method is that too much paint is applied at the center of the stroke and too little at the extreme ends. The distance between the gun and the work may vary almost 2 to 1 throughout the stroke. One common trouble under such conditions is that the center of the stroke is wet while the ends are dry. Arcing the spray gun makes it impossible to apply a uniform coating.

The proper procedure is to hold the gun at right angles to the surface at all times and to trigger the gun at each end of the stroke as shown in Fig. 1. Begin the stroke, then pull the trigger. At end of stroke, release trigger before stroke is completed.

One mistake which often accounts for improper use of the gun by an operator is the practice of adjusting the fluid flow by means of the adjusting screw on the spray gun. Turning this adjusting screw to reduce the material flow increases the spring tension on the trigger. This makes the trigger more difficult to pull and may tire the operator's hand. Thus, there is a tendency not to properly trigger the gun. To overcome this difficulty, it is recommended that the fluid adjusting screw on the gun be left wide open, and that the necessary adjustment be made at the pressure feed tank or at the fluid regulator. A good rule to follow is to use the lowest air pressure possible for satisfactory results. Once the fluid and air pressure for a particular job are determined, the adjustments should be set and not changed until the job is finished.

Another important factor is to hold the spray gun perpendicular to the surface at all times. Figure 2 illustrates by solid lines the correct position in which the spray gun should be held. Dotted lines indicate an incorrect position of the gun. Spray guns are designed to be held, generally, six to eight inches from the work. The operator should decide on a particular distance, depending upon the pattern and speed of flow of the material he happens to be working with at the time. Once set, this distance from the work should be kept constant for uniform results. In the spraying process, solids are atomized and solvents are vaporized. The optimum distance should permit the maximum effect in both, with the prop-

AMERICAN CHEMICAL PAINT COMPANY

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Technical Service Data Sheet

Subject: HOW TO MAKE PAINT STICK TO GALVANIZED IRON WITH LITHOFORM®

INTRODUCTION

"Lithoform" forms a dense, zinc phosphate coating on zinc, cadmium, and galvanized surfaces — including Galvanneal, cadmium plated steel, zinc plated steel, zinc base alloys, and zinc base die castings. The "Lithoform" coating, which is non-metallic and inactive, retards reaction between alkaline metal oxide and the paint film. Peeling and loss of adhesion are thus greatly retarded on painted Lithorized zinc and cadmium.

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"Lithoform" forms a durable bond for paint. It is economical. It eliminates frequent repainting. It protects both the paint finish and the metal underneath. "Lithoform" meets these Government Finish Specifications:

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JAN-F-495
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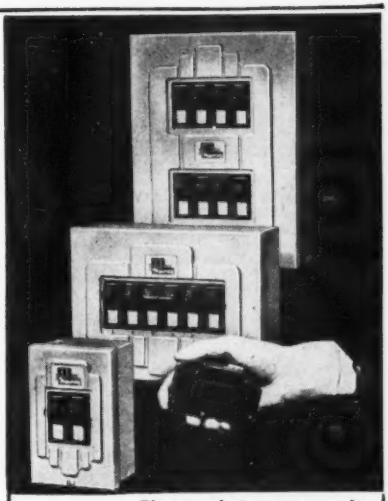

Photograph by courtesy of Murray Manufacturing Corp.

Murray Circuit Protectors are fully magnetic and provide maximum protection for both domestic and industrial wiring. Housings are of galvanized iron which is Spray Lithorized for long paint life.

THE LITHORIZING PROCESS

"Lithoform" can be applied by brushing or spraying the work with simple hand equipment, by dipping it in tanks, or by spraying it in industrial power washers.

Brush. Galvanized bay windows, cornices, rain gutters, hardware, building siding, truck panels, and farm equipment are typical of the many surfaces that are treated effectively with Brush "Lithoform".

Dip. This grade is used for coating cleaned surfaces of such typical products as cabinets, refrigeration condensers, etc., immersed in heated solutions in tanks.

Spray. The spray process is the most logical one with which to coat sheets, coiled strip or duplicate products best processed on a conveyor.

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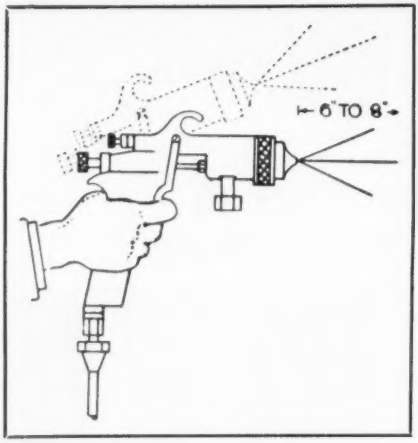


Fig. 2—Spray gun should be held perpendicular to the surface being coated, as indicated by the solid lines in this illustration. *(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)*

er amount of thinner losses between the spray gun and the work.

Spraying Corners

The improper method of spraying corners ,such as are encountered in finishing cabinets, cases and other assembled products is shown in Fig. 3. When the spray gun is operated up and past the corner, as shown, in painting one side, a certain amount of spray is sure to be deposited around the corner. As a result, when the other side is sprayer, there will be overspray around the corners on both surfaces. To remedy this, the sides should be painted up to within 1 or 2 inches of the corners as shown in Fig. 4. Then, by holding the spray gun at an angle with the corner, it can be raised and lowered to coat both sides of the corner simultaneously.

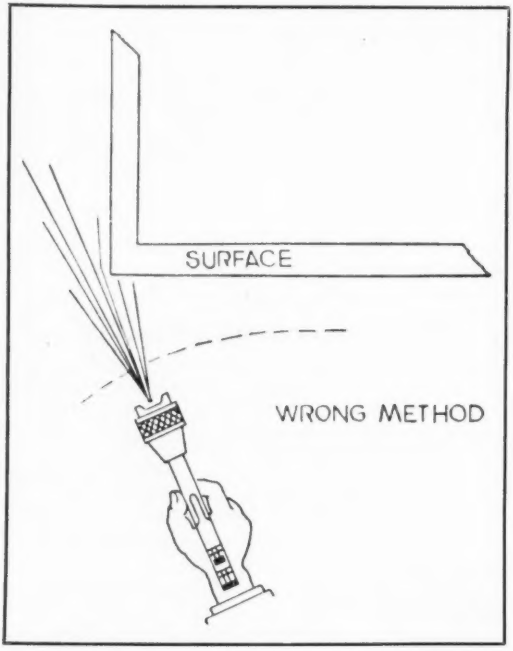
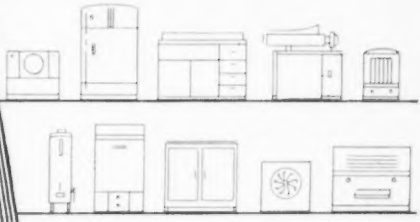


Fig. 3—Improper method for spraying corners. This technique deposits overspray. *(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)*

Spray Gun Motions

An important practice which has been found to increase the efficiency of spraying operations is the principle of keeping a continuity of motion from the time the gun is triggered when starting to paint an article until the gun is off and the article is painted. Wherever the shape of the article permits, it should be painted completely without shutting off the gun. In finishing certain kinds of work this can be facilitated by mounting the articles on a fixture which can be revolved easily.



8 pages of Ideas

to help your product finish help increase sales

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Marketing-minded manufacturers, more and more, are realizing that "one good name deserves another"—that the Sherwin-Williams name, allied with their own trade-mark, contributes the added sales appeal of the best-known name in finishes. There's no easier way to say, "This is a quality finish" to so many people, so quickly.

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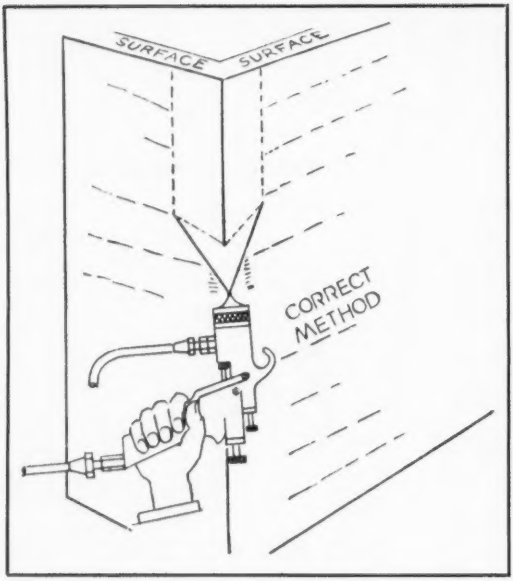

Fig. 4—By holding the spray gun at an angle with the corner, it can be raised and lowered to catch both sides of the corner simultaneously. *(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)*

thereby painting the hub in one continuous motion. In any spray finishing operation, it is desirable to determine the fewest number of strokes and least amount of motion necessary to obtain the desired coverage. The design and use of suitable fixtures will assist in carrying out this principle in finishing many types of metal products.

Where the object to be painted is of such a shape that it can be sprayed while it is rotated, the gun can be held open from beginning to end of the stroke. Figure 5 shows the method used in spraying the metal hubs of wheels. The work here is held and rotated by the work holder. For this job, a 5-inch spray is used. As the hub rotates, the operator simply pulls the trigger back and turns the gun in a 2-inch arc,

Keep Spray Gun Clean

Proper performance of the spray gun is of utmost importance in modern production spray finishing. A spray gun will do its job well if inspected regularly, cleaned, lubricated, and worn parts replaced promptly when needed. To clean a spray gun which has been used with a cup, thinner or suitable solvent should be siphoned through the gun by inserting tube through open container of that liquid. When a gun in used with a pres-

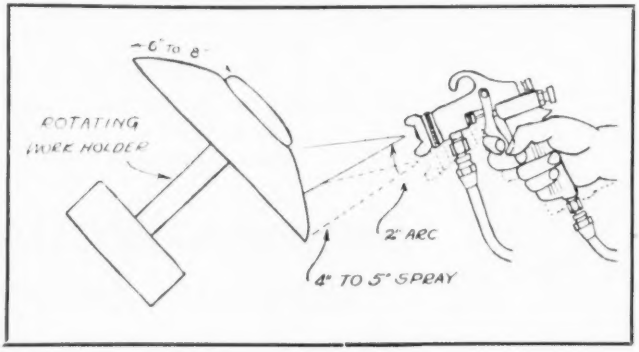

Fig. 5—Where the object to be painted is of such a shape that it can be sprayed while it is rotated, the gun can be held open from beginning to end of stroke. Illustration shows a wheel hub being sprayed in one continuous stroke using rotating work holder. *(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)*

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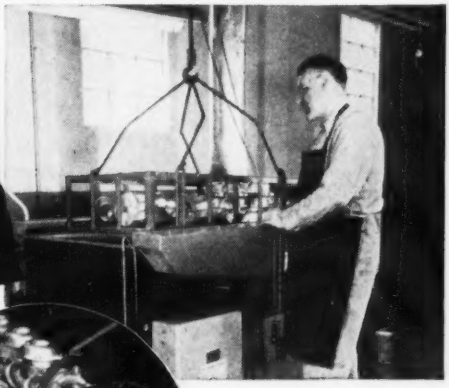
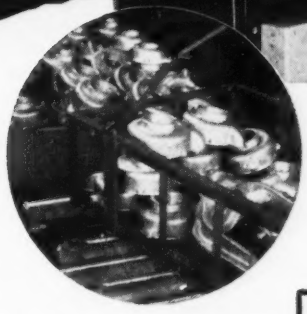




Skilsaw reports improved cleaning before painting and assembly.

Above: **Metal parts are thoroughly cleaned in Phillips high efficiency Model 60 degreaser. Inset shows condition of parts *after* degreasing.**

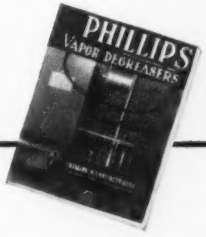
HERE is another case illustrating the high cleaning efficiency of Phillips degreasers. Skilsaw, Inc., Chicago, uses a Phillips Model 60 electric batch-type machine to clean both aluminum and iron castings, steel stampings, shafts and screw machine parts. These parts must be thoroughly cleaned before painting and assembly of the finished product. Among the types of soil removed are coolants, kerosene, drawing oils, and just plain shop dirt.

Skilsaw reports that the Phillips unit cleans their parts better, as well as 3 to 4 times faster than their former method. Thus production is speeded up and better control is assured over the quality of the finished product.

Check into the time and money you can save with Phillips Vapor Degreasing. Our representative will be glad to discuss your parts cleaning problem with you.

SEND FOR YOUR COPY OF THIS NEW BULLETIN

Describes and illustrates Phillips engineered metal cleaning equipment.



Phillips

3457 TOUHY AVENUE • CHICAGO 45, ILLINOIS

MANUFACTURING COMPANY

ENGINEERED METAL CLEANING EQUIPMENT

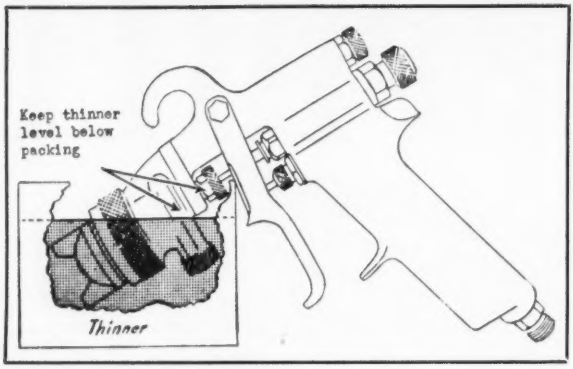


Fig. 6—Illustration shows an acceptable method of immersing the "business end" of a spray gun in thinner. Vessel used should be shallow enough to keep thinner level below packing. *(Photo courtesy The Binks Manufacturing Co., Chicago 12, Ill.)*

tank or gravity bucket, after the material hose is removed the gun should be turned upside down and thinner poured into the fluid opening. In both cases the trigger should be moved constantly to flush out the passageway and to clean tip of needle.

It is poor practice to place an entire gun in thinner. This should be avoided as solvents remove lubricants and dry out packings. Caustic alkaline solutions, likewise, should not be used for cleaning spray guns as they destroy aluminum alloys which may be used in gun bodies and parts. It is good practice to place the nozzle and fluid connection of the spray gun in the thinner as illustrated in Fig. 6. The vessel used should be shallow enough to prevent thinner from reaching packing, otherwise it will be dried out and result in gun spitting.

There's No Substitute for Me...
in Your Finishing Department!
Improved
DETROIT HANDY "TAC" RAG
NON INFLAMMABLE
Remove all dust, lint and sand particles from any surface with Detroit Handy "Tac" Rags before painting. Save time and materials. Ready for instant use. Never harden or dry out.
Complete Satisfaction Guaranteed!
Standard of the FINISHING INDUSTRY Since 1934
DETRO MFG. & SALES CO., CULVER CITY, CALIFORNIA

Palladium, a precious metal of beautiful white color and possessing high strength and good fabricating qualities, is gaining favor throughout the world as the newest precious metal for jewelry and adornments.

CORRECTION

On page 26 of the October, 1952 issue, the phrase "non-impinging Burdette burners" was used. This phrase should have read "non-impinging Eclipse burners.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

IMPORTANT FACTS
ABOUT NIBRI-CEL No. 1

Best of all-fibrous filtering mediums

- ★ Made of 100% pure fibrous cellulose
- ★ Exact fibre lengths maintained, permitting "sharpness" of filtration
- ★ Blended by a new-type machine which insures uniformity
- ★ Forms easily-cleaned layers which do not "slough-off"
- ★ Provides efficient depth filtration
- ★ Quickly forms a pre-coat on either screen-type filters or cloth and paper dressed presses
- ★ Rapid forming of pre-coat offers tremendous advantages in "setting"
- ★ Eliminates clogging of cloth and screen wires
- ★ Fibrous structure maintains steady flow through the filters
- ★ Especially adapted to low-cost clarification work

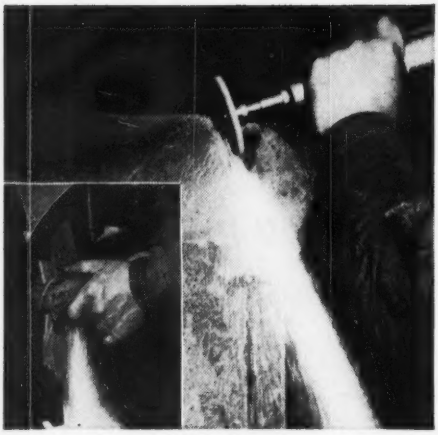
NOTE: When Nibri-Cel No. 1 is used, the filter is "set" by using only ½ oz. of material for each square foot of filter surface. Usually no addition of filter material is required on the run.

Order Nibri-Cel No. 1 Through Any Harshaw Sales Office

THE HARSHAW CHEMICAL CO.

1945 E. 97th STREET, CLEVELAND 6, OHIO

CLEVELAND • CHICAGO • CINCINNATI • DETROIT • HOUSTON
LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH



USE

ATLANTIC *"JOB-FITTED"* Grinding Wheels

for . . . increased productivity . . . lower operating costs!

Get all three of these important production advantages now . . . select top quality Atlantic Grinding Wheels, expertly engineered to meet your specific snagging requirements.

MAXIMUM SAFETY: Every Atlantic Wheel made — from the 2 inch on up — is test run at a 50% higher speed than that required for normal snagging operations. That means less wheel breakage . . . greater on-the-job safety right from the start.

INCREASED PRODUCTIVITY: Whatever the job, Atlantic Grinding Wheels provide maximum wheel strength for continuous, high-speed operation. All are made with a special resinoid bond to assure extra wear . . . designed to cut cleaner, faster. Their smooth floating action requires less pressure, reduces fatigue and makes work easy.

LOWER OPERATING COSTS: Because Atlantic Wheels *seldom have to be dressed*, they eliminate the need for frequent replacements . . . assure lower operating costs on job after job.

Check these time and money-saving advantages for yourself. Send for the new Atlantic Grinding Wheel Catalog today — get the full facts on Speed-Tested Wheels for every job in the shop. Atlantic Abrasive Corp., 567 Pearl St., So. Braintree, Mass.

ATLANTIC ABRASIVE CORP.

South Braintree 85, Massachusetts

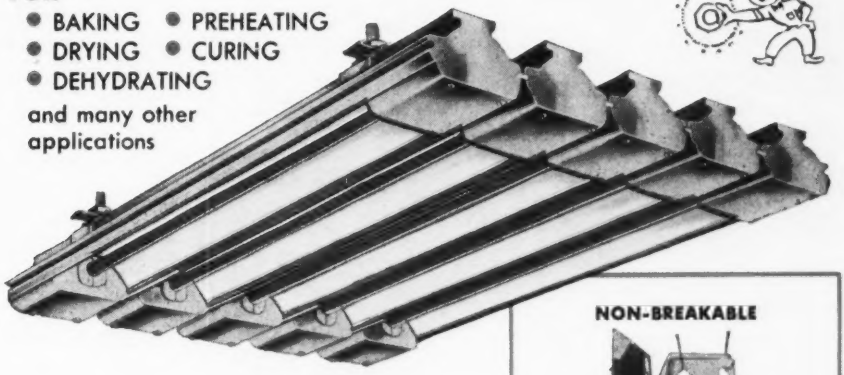
NOW DIAL INFRARED HEAT WITH CHROMALOX

Electric Radiant Heaters

FOR

- BAKING
- PREHEATING
- DRYING
- CURING
- DEHYDRATING

and many other applications



CHROMALOX Electric Radiant Heaters are a new and proved solution to process heat problems. They give you all of these production advantages:

1. **Infrared radiation in longer wave lengths which are absorbed with almost equal speed by all colors and surfaces.**
2. **Uniform blanket of heat without hot spots.**
3. **Infinitely variable heat, adjustable to the work from zero to 100% range, provided by dial controls.**
4. **Quick, low cost oven construction by interlocking units into desired assemblies.**

In addition—all-metal Chromalox Radiant Heaters are unbreakable and immune to shock, vibration, steam and splashed liquids; safe with volatiles.

Why not check this new production line tool? See how it can fit into your finishing operations.

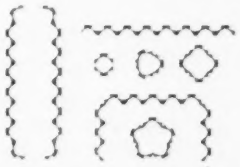
Send for complete Application File

You'll get details on many jobs Chromalox Radiant Heaters are doing in industrial plants; and you'll likely find application ideas which can point the way to added savings and increased production.

NON-BREAKABLE

There's nothing to break—nothing to shatter and contaminate work in process when Chromalox Radiant Heaters are on the job.

VERSATILE APPLICATION



Cross-section views of a few of the many oven designs possible with Chromalox Radiant Heaters.

IC 55

Chromalox electric heat for modern industry

EDWIN L. WIEGAND CO., 7552 Thomas Boulevard, Pittsburgh 8, Pa.

faster heat transfer for 50% of the cost

Stainless Steel Platecoils in a large variety of standard sizes or standard single embossed Platecoils rolled to specific diameters as shown above are finding increasing use in industry because they give five basic advantages in solving heat transfer problems. 1. Lower first cost. 2. Simplified and less costly installation. 3. Takes less space in tank. 4. Higher heat transfer rate. 5. No pipe joints in solution.

Send for complete technical manual and descriptive Bulletin No. P50.

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

LITERATURE

The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

Stainless Steel Platecoils Available Now!

LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction

EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

Kold-Hold Manufacturing Company, Lansing 4, Michigan

"LIQUID ENVELOPE"

PEELABLE SPRAY-BOOTH COATING

THE FIRE-SAFE—LABOR-SAVING METHOD THAT ELIMINATES HEAVY OVER-TIME FOR SCRAPE DOWNS

You'll never know how simple and easy . . . and inexpensive . . . it is to peel-off all accumulated overspray until you use "LIQUID ENVELOPE", the original and still the most satisfactory "strip coating". Why not order a 5 gallon can at the drum-lot price today?

BETTER FINISHES & COATINGS, INC.

268 Doremus Ave., Newark 5, N. J. • 122 East 7th St., Los Angeles 14, Calif.

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Aviation Lubricants Co., San Diego, Calif.
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H. J. Gettemuller Co., Inc., Baltimore, Md.
R. W. Renton Co., Cleveland, Ohio, Indianapolis, Ind.
Supplee-Biddle-Steltz Company, Philadelphia, Pa.
Dean & Barry Co., Columbus, Ohio
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Paints & Lacquers, Inc., Chicago, Illinois
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Metal Goods Corp., St. Louis and North Kansas City, Mo.; Dallas and Houston, Texas; Denver, Colo.; New Orleans, La.; Tulsa, Oklahoma.
Hubbard & Stau, Los Angeles, Calif.
The Plastic Paper Co., Los Angeles, Calif.
C & H Supply Co., Seattle, Wash.
Hugh Russel & Sons, Ltd., Montreal and Toronto, Canada

NEWS of the Industry

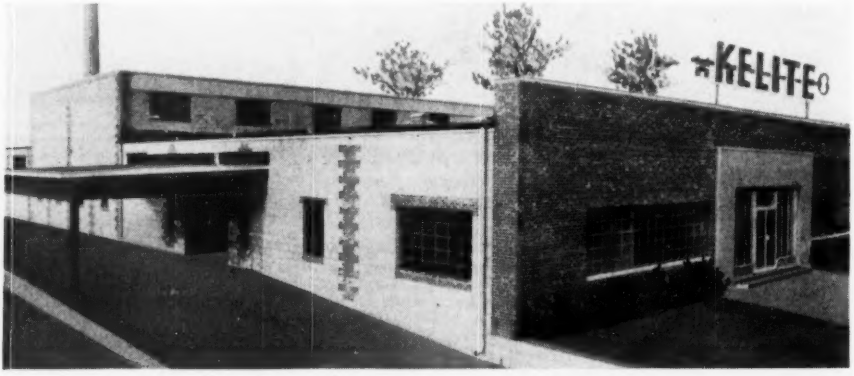
NEW PLANTS

A new manufacturing plant to serve East Coast customers was recently opened by the **PARKER RUST PROOF COMPANY** at Mountain View, N. J. Parker products for surface treatment of metals will be made and shipped from the new plant to the metalworking industry throughout the eastern part of the nation.

Establishment of the Mountain View plant completes an expansion of the manufacturing facilities of the company. The original plant at Morenci, Mich., has been doubled in size and production capacity. The West Coast is served from Maywood, Cal., and a Windsor, Ontario, plant serves Canada.

Ground has been broken in Sharonville, Ohio, for a new $200,000 plant for the **CINCINNATI CLEANING & FINISHING MACHINERY CO.**, manufacturer of industrial cleaning, washing, and paint finishing equipment. The plant, which will have 15,000 sq. ft. of floor space, will employ approximately 50 persons. The Sharonville plant will be the firm's first manufacturing facility in Cincinnati. The company now operates two plants in Ironton, Ohio.

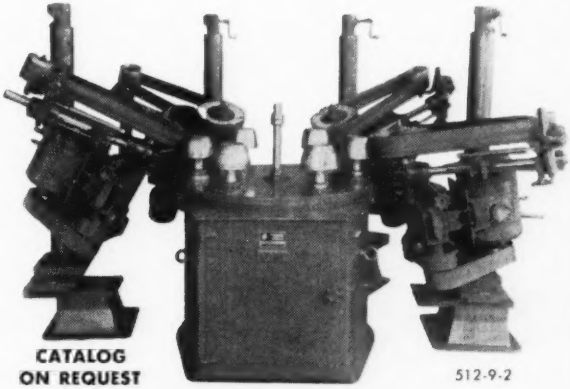
KELITE PRODUCTS, INC., manufacturers of cleaning and processing compounds and steam cleaning machines, has completed its new factory and sales offices at Berkeley Heights, N. J. William



New factory and sales offices of Kelite Products, Inc.

ACME *Automatic* POLISHING and BUFFING MACHINES *are dependable in production!*

This ACME Automatic 40" Rotary shown has a six-station indexing table arranged with four ACME type G-1 adjustable floating head buffing lathes equipped with polishing belt arm attachment. ACME Automatic Rotaries are available in indexing table sizes from 18" to 10' diameter and up to 24 ft. with continuous tables.



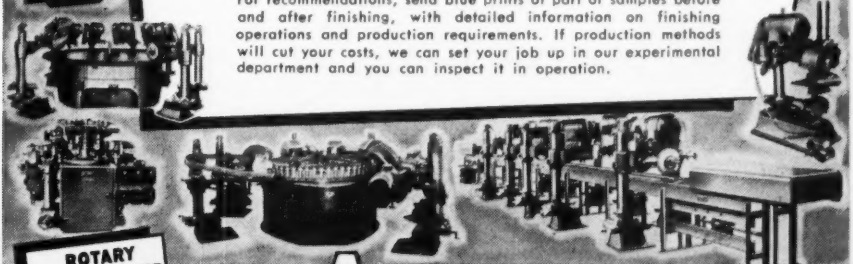
CATALOG ON REQUEST

512-9-2

ACME *Automatics* PROVIDE EFFECTIVE SOLUTIONS TO PROBLEMS OF *POLISHING* • *BUFFING* • *GRINDING* • *DE-BURRING* • *WIRE BRUSHING* • *MICRO-FINISHING* •

For nearly 50 years ACME has successfully solved many difficult production finishing problems. This varied experience and specialized engineering is your strong assurance of performance that will cut high man-hour costs with efficient high production machine-hours.

For recommendations, send blue prints of part or samples before and after finishing, with detailed information on finishing operations and production requirements. If production methods will cut your costs, we can set your job up in our experimental department and you can inspect it in operation.



ROTARY STRAIGHT LINE SEMI-AUTOMATIC AND SPECIAL *Polishing and Buffing Machinery*

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

Sorenson, vice-president in charge of manufacturing and sales for the Atlantic division will head the new plant. Headquarters of Kelite is in Los Angeles with additional plants in Chicago and Dallas, and Service Offices in 86 principal American cities and 15 countries abroad.

THE PORCELAIN ENAMEL PRODUCTS CORP., a division of the Bettinger Corporation of Waltham, Massachusetts, has acquired full ownership of the Veos porcelain-on-steel wall tile manufacturing process from the Whirlpool Corporation of St. Joseph, Mich., according to an announcement by Robert A. Weaver, Jr., president.

COMPANIES

Dr. C. B. F. Young, well known consulting electrometallurgist, has purchased the **APLEY N. AUSTIN CO.** of Pequabuck, Conn. This company manufactures alkali cleaners, and a complete line of polishing and buffing compounds, the premium line of which is a dispersable bar known as Solubar.

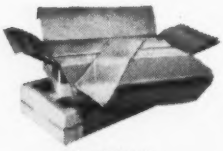
Dr. Young will devote his time to the improvement of the products of the Apley N. Austin Co., and Mr. Austin will continue to function in his capacity as vice-president and general manager.

THE NEWCOMB-DETROIT COMPANY has announced the acquisition of Windsor Metal Fabricators, Ltd., a Canadian firm in Windsor, Ontario. This subsidiary will be called Newcomb Industries, Ltd., and will manufacture industrial ovens, spray booths, parts washers, dust collectors and general metal fabricating work at a new location on London Street in Windsor. This shop has approximately 10,000 sq. ft. of floor space, and is completely equipped.

Formation of a new Hooker subsidiary, **HOOKER CHEMICALS, LIMITED,** a British Columbia corporation, has been

For Dust Free Finishes!
BOND TACK CLOTH

IN ROLLS
Cut off any size piece to use as needed.



IN BULK
Cut and folded. Ready to use.

STAYS SOFT AND TACKY — A SPECK-FREE FINISH EVERY TIME
Now Available in Rolls or Cut Bulk—White or Gold
In Three Different Types of Cloth

Get your Tack Cloth packed just the way it's easiest for you to use . . . either in 150 yard rolls of 36" wide cloth or in handy cartons . . . 100 or more Tack Cloths to the carton.
No matter which way you buy it, you can be sure that every square inch will stay SOFT and TACKY until the very last bit is used up!
The Cut Bulk size is 18" x 36" . . . folded to 4½" x 18" for ease of handling. ALL BOND TACK CLOTH is *Spontaneous Combustion Proof, Lint-Free* and *Wax-Free*. Gives a sparkling speck-free Finish every time. Clean and sanitary. No waste.

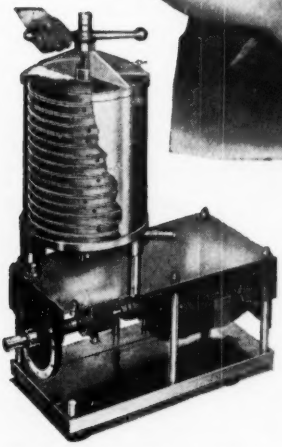
TRY THEM and COMPARE RESULTS. Samples Gladly Sent Upon Request.

BOND CHEMICAL PRODUCTS CO.
"The Tacky Wiper Specialists"
2639 N. CLYBOURN AVE. CHICAGO 14, ILLINOIS

ALSO INDIVIDUALLY PACKED IN GLASSINE ENVELOPES —144 to the Carton

A WARRANTY OF SATISFACTION IN EVERY CARTON

guard against Rejects



"Sealed Disc" Filters were designed especially for plating rooms. They're smaller, compact, and more portable than ordinary conventional Filters, and they are also performing satisfactory results on many acid dips, electro cleaners, and solvents.

You Can Be Sure With A "Sealed Disc" Filter

More and more cost-minded platers depend on Alsop "Sealed Disc" Filters to remove dirt, dust, and sludge from their plating solutions. They get better finished plated work—they save time and labor, and their plating solutions last longer. The "Sealed Disc" Filter assures positive, trouble-free performance that's proof against even the invisible impurities that cause nodules and porousness—proof against rejects and reworking. There's a "Sealed Disc" Filter "to fit your job"—write for complete information, the Alsop Engineering Corporation, 711 Keen Street, Milldale, Connecticut.

ALSOP ENGINEERING CORPORATION

Filters, Filter Discs, Pumps, Tanks, Mixers, Agitators

Fitted for Every Job Need

DIPPED NEOPRENE INDUSTRIAL GLOVES

SAFE—They can help prevent costly accidents. The rough-surface fingers assure positive, easy gripping. And Neoprene withstands gasolines, oils, greases and corrosive chemicals.

COMFORTABLE—The curved finger construction conforms to the natural curve of hand—eliminates straining and pulling. Highly flexible, they permit easy, natural working motions.

ECONOMICAL—They are built for long wear and tough service. Full range of sizes, lengths and weights. U. S. technical men will be glad to analyze your glove needs and recommend the correct glove for each of your jobs. Available from your nearest United States Rubber Company Branch.

U. S. INDUSTRIAL GLOVES

UNITED STATES RUBBER COMPANY

announced by R. L. Murray, president of Hooker Electrochemical Company, Niagara Falls, New York. The new company is acquiring a plant site on Burrard Inlet which will provide for future manufacturing of Hooker chemicals in this area.

NEW POSITIONS

A. DONALD KELSO, executive vice president and director of Norton Behr-Manning Overseas Incorporated, became president of that company succeeding **HERBERT A. STANTON** who is retiring. The announcement was made by Milton P. Higgins, president, Norton Company.

An expert on foreign markets, Mr. Kelso has been in the coated abrasives business since 1921. He is a director of Behr-Manning Corporation, and was formerly president of Durex Corporation and Durex Abrasives Corporation.

Mr. Stanton has served Norton Company for over 40 years. An authority on international banking as it affects the exchange of money, he is a well-known figure in the major markets of the world.

Appointment of **R. F. LEDFORD**, as director of sales and research, Industrial Filter & Pump Mfg. Co., Chicago 50, Illinois, has been announced by Ralph E. Liedberg, vice president and general manager.

R. F. Ledford

Mr. Ledford was formerly superintendent of finishing, Sunbean Corporation, and prior to that sales engineer, Hanson-Van Winkle - Munning Company. He is president of the Chicago branch and member of the research committee A.E.S., also a member of the Electrochemical Society and American Society for Testing Materials.

Announcement is made of the election of **ELDEN E. BOLDS**, of Cleveland, as director of Edwin L. Wiegand Company, manufacturers of Chromalox electric

DUST AND FUME CONTROL
TODAY'S BEST BUY!
There are few Dust and Fume conditions which cannot be successfully analyzed and properly ventilated by Young & Bertke Engineers and Systems.
Dust threatens everyone — its effect is devastating. The best of machinery cannot operate. Dust causes breakdowns, wastes time, operating hazards and spoilage on the assembly line.
Do you want your plant advertised by your neighbors as having fumes coming from it?
Remove Dust and Fumes at their source with a Young & Bertke system. Efficient control for all types of Industry.
DESIGNED • FABRICATED • INSTALLED

The YOUNG & BERTKE Co.

DUST and FUME CONTROL • OVENS • SPRAY BOOTHS

2291 BUCK ST. • CINCINNATI 14, OHIO

heating equipment. Mr. Bolds is a partner in the firm of Anderson-Bolds, Inc., Wiegand representatives in Cleveland.

PATRICK A. CAVUTO, formerly in charge of the electroplating department of Muzak Corporation, has joined the sales and service department of the Electroplating Division of United Chromium, Incorporated. Mr. Cavuto recently completed a comprehensive training course at the Detroit laboratories of United Chromium. He is now selling and servicing the complete line of Unichrome plating processes, materials, and equipment in the New York City area.

Patrick A. Cavuto

Before World War II Mr. Cavuto, who attended the University of Rochester, was employed as Assistant Purchasing Agent for the Will Corporation, dealers in laboratory apparatus and supplies.

Announcement is made by Ernest G. Brown, vice president and general manager of the United States Rubber Company's Passaic, N. J. plant of the appointment of **HENRY W. WILLARD** as plant manager. Mr. Willard succeeds William C. Bowker, who retired.

Mr. Willard started with the company in 1929 and after holding various positions was promoted to the office of general superintendent in 1950. He is a graduate of Cornell University.

PURDY MILLER has been appointed manager of molded goods sales, according to W. A. Tipton, sales manager of the Mechanical Goods Division.

Mr. Miller, who will make his headquarters in Passaic, N. J., was formerly assistant manager of the Chicago branch.

JACK S. BRUNDAGE has joined the New England sales and service staff of the organic coatings division of United Chromium, Incorporated. Mr. Brundage, a member of the New Haven Branch of the American Electroplaters' Society, will sell and service the complete line of Unichrome lacquers, enamels, and synthetics with particular emphasis placed on clear coatings for bright metal finishes.

Jack S. Brundage

Mr. Brundage, a resident of Stamford, Connecticut, was an employee of the Zapon Division of the Atlas Powder Company from 1936 until June of 1952. He served in the U. S. Army for five years and upon his release returned to Zapon as a sales engineer and held that position until joining United Chromium.

Rapid Electric Company, Bronx, New York, has announced the appointment of **FRANK LaMANTIA** as chief purchasing agent. One of Mr. LaMantia's chief responsibilities will be coordination of procurement with production schedules.

RAYMOND DEARTH has joined the Udylite Corporation, Detroit, Mich., as sales engineer for the northern Indiana area.

Raymond Dearth

Before joining Udylite, Mr. Dearth, a chemical engineer, was with the Anderson Company, Gary, Indiana, as a rubber technician and metal finishing engineer. He spent five and one half years in the U. S. Army, and prior to that he was associated with both the U. S. Rubber Company and the Firestone Tire and Rubber Company.

ENTRANCING

● Highlight your product with an attractive finish . . . for as the finish is the final step in production, it is the first step toward sales. • Upon request, our competent staff of technicians will carefully analyze your finishing needs with a constructive, critical viewpoint — will then prepare a sample coating that best fits your purpose. • We invite you to take advantage of this service without cost or obligation.

Research, Quality, Service

ROCKFORD VARNISH *Company*
ROCKFORD, ILLINOIS

Manufacturers of Protective and Decorative Coatings

Affiliate
GORDON BARTELS CO.
Roller Coating Specialists

SOLOMON R. BAKER, of Worcester, Mass., and Beverly Hills, Calif., has been elected president of Pyrene Manufacturing Company of Newark, N. J.

O. H. Tiedeman

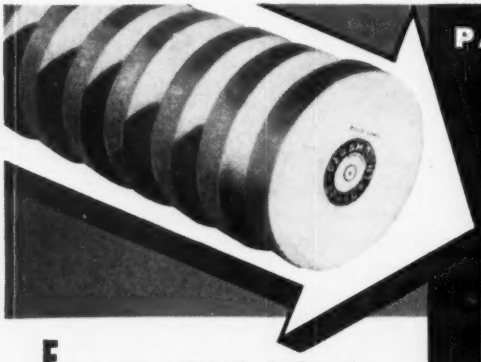
According to an announcement by Joseph Wagner, president, Wagner Brothers, Inc., Detroit, Mich., has elected **O. H. TIEDEMAN** to the Board of Directors as vice president in charge of sales.

Mr. Tiedeman has been with the company since 1947 where he first handled sales engineering for the Wagner-Tiedeman Electroplating Rectifier which he developed.

Mr. Tiedeman has since then become Chief Engineer and Operations Manager, being responsible for the significant development of rectifiers in the metal finishing industry.

Joe H. Shockcor

Enthone, Inc., New Haven, Conn., manufacturers of chemical products and processes for finishing of metals have announced the appointment of **J. H. SHOCKCOR** as sales engineer. Mr. Shockcor is a native of Pennsylvania and received his B.S. in Chemical Engineering from Lehigh University in 1950. He was employed in the research laboratories of Enthone, Inc., for two years, and will service Enthone products in eastern Pennsylvania, Maryland, Delaware, Washington, D. C. parts of Virginia and Tennessee.



PARAMOUNT BRAND

FELT WHEELS ...TOPS IN Durability

Even the softest of Felt Wheels offers a durability difficult to match with any other of the commonly used fabric materials. Not only is felt tough and resistant to wear but when wear does occur, the wheel can be re-faced or re-contoured.

The net result of this durability is longer wheel life—longer *useful* wheel life. Try a Paramount Brand Felt Wheel of the proper hardness competitively. Check it against other wheels. We are confident it will show you greater earnings as measured by finished articles per wheel life.

BACON FELT COMPANY

Established 1825

447 West Water Street — Taunton, Massachusetts

"America's Oldest Felt Manufacturer" — "Felt Does It Better"

Your Supply House can Furnish Bacon PARAMOUNT BRAND FELT BOBS & WHEELS

Corrosion Ruining Your Equipment?

Construct with LUCOFLEX
the hard vinyl structural plastic

If the life of your equipment is short, why not think in terms of *new* materials of construction? Whether it's valves, ducts, tanks, hoods or piping, think of the advantages of a material that is both rigid and has high impact strength . . . with *outstanding* corrosion resistance.

Where to use LUCOFLEX

- *To handle, carry and hold electroplating solutions.*
- *As corrosion-resistant electrical wire covering.*
- *To carry caustic solutions, acids, some solvents in chemical plants.*
- *In food processing plants.*
- *In rayon-processing plants.*
- *In petroleum plants — gas lines, crude oil lines, and valves.*

Solve your chemical construction problems with LUCOFLEX

LUCOFLEX

Write for technical data today

AMERICAN LUCOFLEX, INC.
1 East 57th Street, New York 22, N. Y.

Licensed Fabricator

E. L. COURNAND & CO.
3835 Ninth Avenue, New York 34, N. Y.

William M. Clossey

Announcement has been made by Cowles Chemical Company, Cleveland, Ohio of the election of **WILLIAM M. CLOSSEY** as Secretary and Treasurer.

Mr. Clossey was Secretary and Treasurer of Broadhead Garrett Company in Cleveland prior to joining Cowles and before that was a supervising accountant for Ernest & Ernest. He is a member of the Ohio Society of Certified Public Accountants.

SOCIETIES

The International Tin Research and Development Council has adopted a new name and is now known as **THE INTERNATIONAL TIN RESEARCH COUNCIL.** This change will not affect the policy of the Council nor alter its current activities.

THE NATIONAL SPRAY PAINTING AND FINISHING EQUIPMENT ASSOCIATION was reactivated and reorganized recently at a series of meetings in the Conrad Hilton Hotel in Chicago. Members unanimously adopted a resolution to accept associate members from companies in related types of finishing equipment manufacture, such as exhaust equipment, pumps and heaters.

Officers elected were: president, Reginald B. Hiley, president of the Black Mfg. Co.; vice president, Alan F. Sharpe, president of the Sharpe Mfg. Co.; treasurer, T. L. McCorkle, M & E Mfg. Co.

NECROLOGY

GEORGE G. KNECHT, district manager for the Hanson-Van Winkle-Munning Company, Matawan, N. J., died suddenly of a heart attack.

Mr. Knecht spent his entire business life in the electroplating industry and was well known throughout the field. He had been with Hanson-Van Winkle-Munning for some 30 years. He was a past officer of the American Electroplaters' Society and a member of Hejaz Grotto.

CHARLES H. ELDRIDGE, one of the early pioneers in chromium plating, died recently. His contribution to the growth of the plating industry during the past three decades is attested by the numerous technical papers and patents in his name. Mr. Eldridge directed the operation of the first job plating shop for chromium plating, and later was active in research and service work for United Chromium, Incorporated.

meetings OF INTEREST TO FINISHERS

Dec. 12. Newark Branch, A. E. S., Annual Educational Session.

Dec. 13. Newark Branch, A. E. S., Christmas Party and Banquet, 7 P. M., Robert Treat Hotel.

January 17, 1953. Baltimore-Washington Branch, A.E.S., Educational Session, Evening Dinner and Dance, Statler Hotel, Washington, D. C. Tickets, $6.00 per person, may be obtained from William E. Metzger, Jr., branch treasurer.

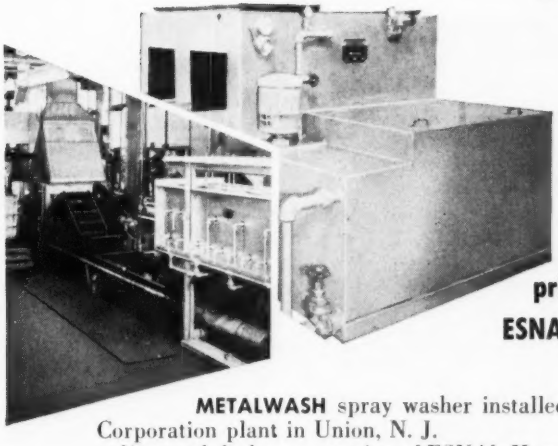
Jan. 21. National Spray Painting and Finishing Equipment Association, Chicago, Illinois.

Jan. 24. Grand Rapids Branch A. E. S. Annual Educational Session (2 P. M.), **and Banquet** (7 P. M.), Pantlind Hotel.

Jan. 31, Annual Meeting, Educational Session and Banquet, Chicago Branch, American Electroplaters' Society, Conrad Hilton Hotel, Chicago, Illinois. Tickets, $10.00 per person, may be obtained from Rudy Hazucha, banquet chairman.

Apr. 18. Annual Technical Session and Banquet, Boston Branch, A. E. S., Hotel Statler, Boston, Massachusetts.

productive WASHER installation



#2744

for cleaning prior to tempering of ESNA* self-locking nuts

METALWASH spray washer installed at Elastic Stop Nut Corporation plant in Union, N. J.

View at left shows a portion of ESNA's Heat Treating Department. Self-locking nuts are conveyed through two American Gas Reciprocating Furnaces into AGF conveyorized quench tanks. Mesh conveyors carry the work into **METALWASH** hot spray washer where quenching oil is removed prior to tempering.

METALWASH machine conveys the work directly into continuous tempering unit (not visible in photo).

*ESNA is the registered trade mark of Elastic Stop Nut Corp. of America.

METALWASH *Finishing Engineer*, a new quarterly publication, is available on request to engineers and executives to whom cleaning and finishing are operations of interest. Please write us on your company letterhead if you are interested in receiving the **METALWASH** *Finishing Engineer* regularly.

metalwash MACHINERY CORPORATION

915 North Avenue · Elizabeth 4, N. J.

representatives in principal cities

Finishes

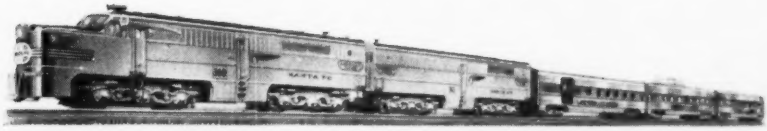
Gilbert Erector Sets utilize a variety of attractive finishes. Wheels are finished in red and aluminum lacquer; girders are bright zinc plated; motor parts are dipped in gray synthetic baking enamel; gears are brass-plated and then coated with clear lacquer; base plates are dipped in aluminum baking enamel.

(Photo courtesy A. C. Gilbert Co., New Haven, Conn.)

The frame of the Schwinn "Black Phantom" balloon-tired deluxe bicycle is finished in black baked enamel. Fenders, rims and various fittings of this attractively styled bicycle are finished in bright chromium plate.

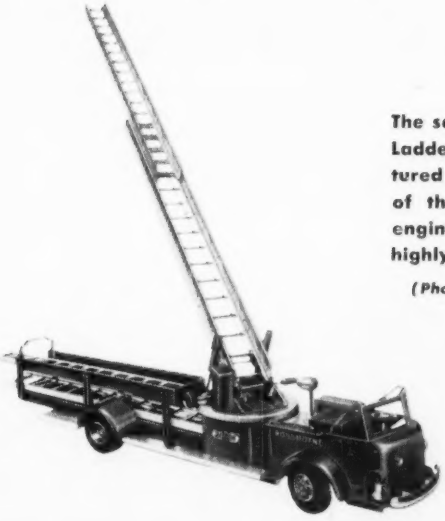
(Photo courtesy Arnold, Schwinn & Co., Chicago 39, Ill.)

that aid in appearance and utility



The model electric train here illustrated is finished basically with aluminum lacquer. Red, yellow and black stripes are applied on a masking machine and other aluminum parts, not painted, are buffed to a high lustre.

(Photo courtesy A. C. Gilbert Co., New Haven, Conn.)



The scale model American La-France Aerial Ladder Truck here illustrated is manufactured from steel and aluminum. The body of the attractive toy is finished in fire engine red enamel. Ladder sections are highly polished aluminum.

(Photo courtesy Chas. Wm. Doepke Mfg. Co., Rossmoyne, Ohio)

New • EQUIPMENT • MATERIALS • PROCESSES

Selenium Rectifier DC Power Supply

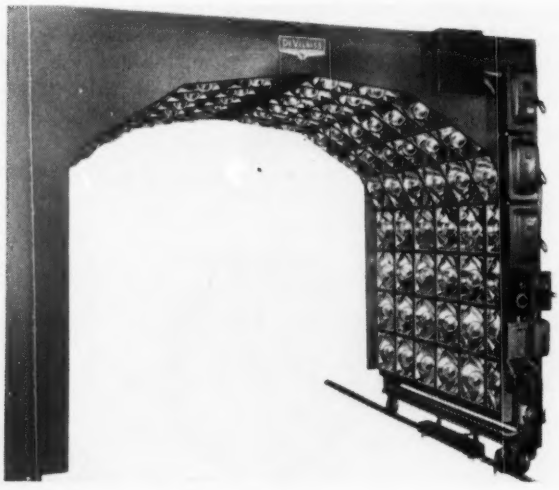
Rapid Electric Company, 2881 Middletown Road, New York 61, has announced a line of selenium rectifier power supplies designed for installation at individual work stations. Each of the two models, a 300-watt unit and a 500-watt unit, operates from a 115-volt 60-cycle line, and furnishes from 90 to 135 volts of filtered DC output. Output voltage may be varied in approximately equal steps by a 5-position tap switch. Output ripple is less than 5 per cent at full load. Both units are rated for continuous duty at full load.

Traveling Infra-Red Oven

Announcement of the availability of infra-red baking panels and traveling ovens has been made by the DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio. Two sizes of baking panels, and three ovens, are available in sizes to handle complete cars. According to the manufacturer, the ovens may be used inside the spray booths to bake the finish. The bake unit is fully automatic and is equipped with an electrically coupled timer and speed control mechanism. It also has selective switches to control individual lamp zones.

The traveling ovens, DeVilbiss engineers claim, can be installed three ways. The ovens may remain permanently in the booth, or a vestibule may be added to the booth to protect the unit from overspray and dirt. The third method is the addition of a drying area attached to the booth which permits the spraying of another job while a car is being dried.

According to the manufacturer, the infra-red heat bakes enamels in 30 minutes and dries lacquer and undercoats in 10 minutes. All equipment is approved by the Underwriters Laboratories, Inc.



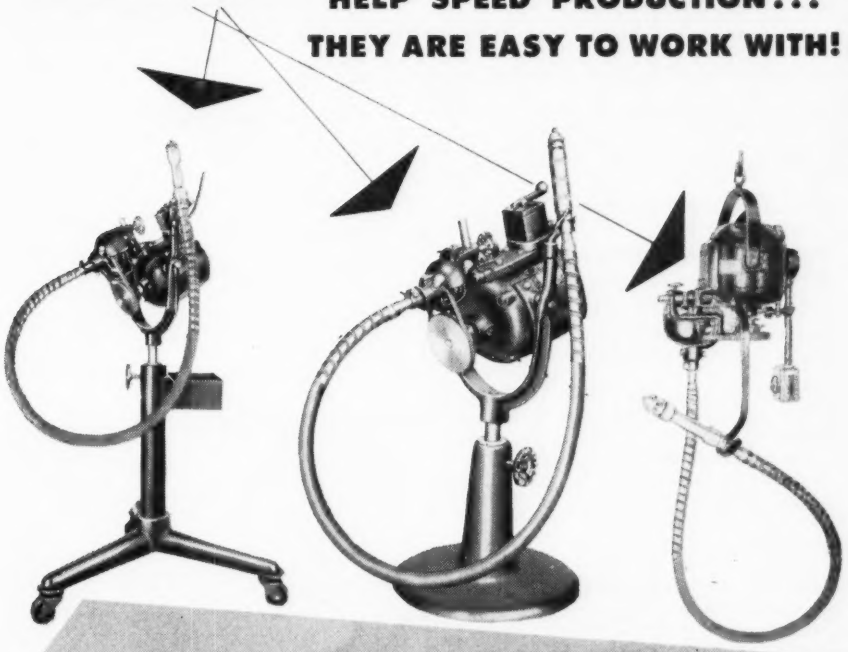
Traveling infra-red bake oven.

Strand
FLEXIBLE SHAFTS

FLEXIBLE SHAFT MACHINES

HELP SPEED PRODUCTION...

THEY ARE EASY TO WORK WITH!



Available in a wide selection of models

The Strand line of flexible shaft machines is able to meet requirements with models that fit shop space to best advantage... you can select bench or floor mount or overhead type depending upon your needs. They also meet job requirements for varying H.P. and R.P.M. Strand flexible shaft machines are known for quality and give top performance and trouble free service. They are long lasting and prove a sound investment. Be sure to review the complete Strand line before you buy.

If your favorite distributor does not handle the line, for further information write to the nearest address shown below.

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Maryland

WESTERN SALES
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When employees hands are comfortable and properly protected by the *right* gloves for the job:

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—all at lower per hour glove cost to your plant!

N-36 medium weight all neoprene glove, 11" length. Snug curved fingers, non-slip grip surface afford almost bare-hand dexterity.

Long-wearing liquid-tight neoprene Stanzoil industrial gloves resist damage from acids, oils, solvents, caustics. 32 styles, weights, sizes, colors. New PIONEER catalog shows you *at a glance* how to select the most efficient and economical gloves for each operation. It pays you to write for your copy today.

Industrial Products Division

The PIONEER Rubber Company

285 Tiffin Road • Willard, Ohio

STANZOIL PIONEER

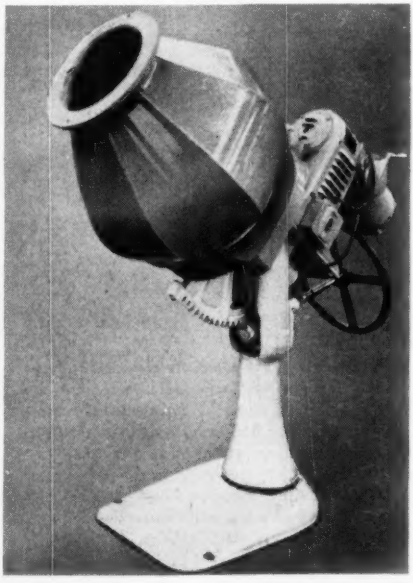
Quality Gloves for over 30 Years

P.S. If your glove problems are unusual because of the nature of your product finishing operations, PIONEER welcomes the opportunity to help you solve them. Write us about your needs and problems — you'll save money, improve your glove service.

Tumbling Barrel

A tilting tumbling barrel with a direct drive 1 h.p. motor, developed by the Hupp Corporation, Globe Division, 1250 W. 76th St., Cleveland 2, Ohio, is said to produce better work action, due to the restrictive nature of the flask-shaped design, for deburring and burnishing of all types of precision parts. According to the manufacturer, the flask-type barrel design concentrates the load into a smaller working area, increasing the efficiency of the tumbling action.

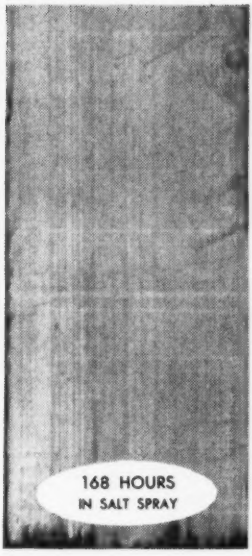
The machine is available in sizes for loads ranging to 750 pounds, and a low gear ratio makes it easy to lower or raise the barrel even when loaded to capacity. It is constructed of continuous welded sections of heavy steel plate. A ¼-inch lining of abrasion-resistant rubber or neoprene, vulcanized to the barrel, is stated to provide effective insulation and give longer life to the barrel shell while protecting parts against nicking,

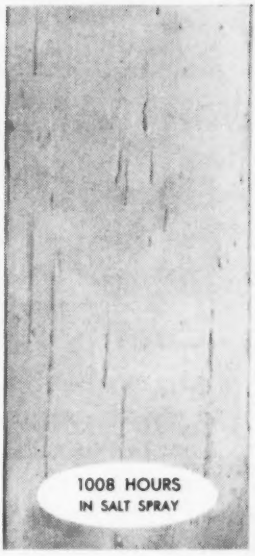


Flask-shaped, tilting tumbling barrel.

and scratching. Use of the lining permits the barrel to be used interchangeably for deburring and burnishing.

All moving parts are lubricated through





SALT SPRAY TESTS SHOW CORROSION RESISTANCE

Panel of bare 24ST Aluminum, untreated. Extensive corrosion after 168 hours in salt spray.

Panel of bare 24ST Aluminum, treated with Bonderite 710. No corrosion after 168 hours in salt spray.

Panel of bare 24ST Aluminum, treated with Bonderite 710. In excellent condition after 1008 hours in salt spray.

ALUMINUM gets increased corrosion resistance, greater durability for paint, with BONDERITE* 710

Here's the surface treatment that practically ends the problem of corrosion on aluminum. Even on high-strength alloys, most susceptible to corrosion, Bonderite 710 protects bare metal for amazingly long periods without failure. Its performance as a base for paint is outstanding.

Bonderite 710 produces an amorphous chromate coating on aluminum surfaces. It can be applied by spray, immersion, or brush, on sheets, castings, forgings and extruded and rolled forms. It operates at low temperatures and is sludge-free.

Bonderite 710 is a liquid—safer and easier to handle, easier to use, more positive in results.

This product's performance equals (*exceeds*, in most important requirements) the government specifications for chemical treatment of aluminum and its alloys.

For bare corrosion resistance, or as a corrosion-resistant base for paint, investigate Bonderite 710 for aluminum.

SEND FOR FREE TECHNICAL BULLETIN—Write today for FREE illustrated bulletin on "Bonderite 710 for Aluminum".

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BONDERITE—corrosion resistant paint base
BONDERITE and BONDERLUBE—aids in cold forming of metals
PARCO COMPOUND—rust resistant
PARCO LUBRITE—wear resistant for friction surfaces

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

Quality starts with a Superior finish

The finish on your product reflects the craftsmanship, the quality of that item. That's why so many metal fabricators specify Haskins Flexible Shaft Machines for all their polishing, sanding, grinding, buffing, and filing operations. Like this manufacturer of stainless steel sinks, they have found that Haskins power and the right attachment provide precision operation that assures quality production.

Because you handle only a light handpiece—not a heavy motor—you find that operator fatigue is reduced, production goes up. And multi-speed power allows selection of the right speed for varied operations.

You'll find the right combination of power, speed and attachments for your specific application in the complete Haskins line. Write today and ask for our recommendation on your grinding, sanding, filing or polishing job — no obligation, of course. R. G. Haskins Co., 2643 W. Harrison St., Chicago 12, Ill.

Your choice of Bench Mounted, Suspended, or Pedestal Mounted.

haskins

FLEXIBLE SHAFT EQUIPMENT

alemite fittings, and bronze bushings are employed at all friction spots. Speeds as low as 17 r.p.m. are available, and standard equipment includes variable speed motors which will furnish speeds of from 10 to 35 r.p.m.

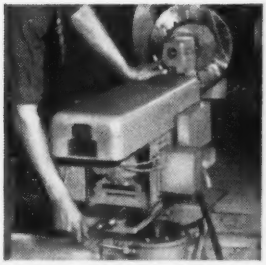
DeVilbiss EGA Spray Gun

A spray gun with ultra sensitive controls for fine spraying has been introduced by the DeVilbiss Company, 300 Phillips Ave., Toledo 1, Ohio.

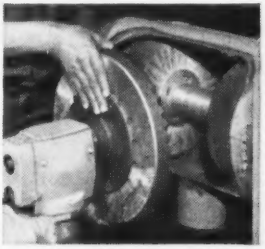
The gun, Type EGA, is designed for small refinishing jobs, stenciling, blending, high-lighting and decorative work. Its spray pattern is medium sized and can be adjusted to practically pin point size for touch-up work, according to the manufacturer.

DeVilbiss Spray Gun, Type EGA

OSBORN



SET-UP IS SIMPLE. The machine is versatile. If your production involves small runs of many different types and sizes of gears and similar parts, you can specify machine settings for each part and operator can make set-up changes easily and quickly for maximum daily output. The complete brushing cycle is controlled automatically by the electronic timer which is set for any desired brushing interval to suit the size, shape or condition of part being brushed.



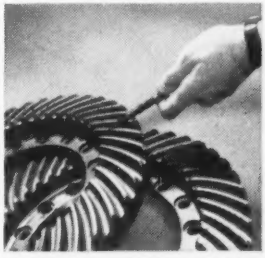
OPERATION IS SPEEDY. The operator mounts the gear easily and quickly. The gear advances to the face of two rotating Osborn brushes and the edge of the gear teeth makes contact with the brushes. To assure fast, positive action on each piece brushed, an automatic control reverses the direction of brush rotation on every cycle of operation.

Deburrs gears 15 times faster at the push of a button!

Want to break a big bottleneck in the production of gears and similar parts? Manufacturers are doing just that with the Osborn Work Holder Brushing Lathe.

In the plant of the White Motor Company, Truck Division, Cleveland, Ohio, this Osborn machine deburrs and finishes gear teeth 1570% faster than the old method. This was done formerly with a portable grinder . . . a tedious operation that took 25 minutes for the 14-inch hypoid gears shown. Now, an operator simply places the gear in the Osborn Work Holder Brushing Lathe, pushes a button and the machine does the job automatically. Floor-to-floor time is only 1½ minutes! Uniformity of finish results in additional time savings in matching and assembly of gears.

It will pay you to investigate this high-speed, high-quality machine for deburring and finishing gears on a production basis. Call your **O**sborn **B**rushing **A**nalyst today or write *The Osborn Manufacturing Company, Dept. 896, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



RESULTS ARE UNIFORM. Burrs and sharp edges are removed uniformly. Every gear tooth has smooth, uniform rounded edges. Surfaces are blended.

INVESTIGATE IT TODAY

for *your* problems. Users report time savings ranging from 20% to 1570% with the Osborn Work Holder Brushing Lathe. Let us demonstrate what it can do for you!

Osborn Brushes

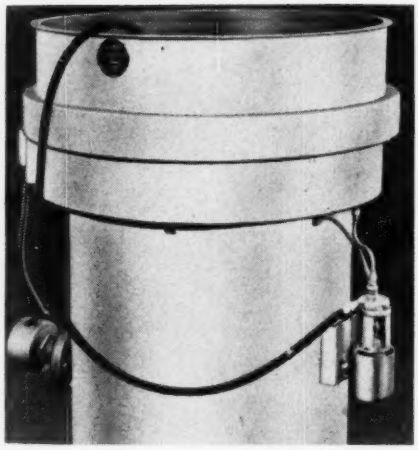
OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

The body of the EGA is an aluminum die casting, which permits the use of a wide range of materials including latex. The smallest spray gun in the DeVilbiss line, it can be used with standard glass jar fluid containers of 2, 4, 6, or 16 ounce capacity. The trigger which actuates both air valve and fluid needle is designed for left or right hand operation.

Semi-Portable Degreaser

The Detrex VS Jr Degreaser has been announced by the Detrex Corporation, Box 501, Detroit 32, Michigan. Stated to be highly efficient, the compact unit is designed to clean small and medium sized parts at a rate of up to 600 pounds per hour.

Two standard, manually operated models are available; one of these is electrically heated, the other is steam heated. During operation, parts are suspended in pure solvent vapor which dissolves soils of dirt and grease. A spray of hot solvent flushes away any loose, stubborn soils which might remain. Finally, a rinse in pure solvent vapor leaves the work clean and dry.



Semi-Portable Degreaser

All work may be placed in baskets or on racks or hooks for quick, easy handling. The equipment is only 48 inches from the top to the base, affording a low, convenient working height. The interior of the equipment is coated with Detrex FF-1, the new non-porous coating which is completely corrosion-proof and unaffected by degreasing solvents.

The VS Jr is stated to be easy to install, and economical to operate.

20 KW Unit Heater

The Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa., has announced the addition of a 20 kw. model to its line of UB series of blower-type electric unit heaters. This model is suitable for

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The MOST COMPLETE story on barrel finishing ever told: Opens your eyes to amazing new developments in barrel finishing equipment - compounds, abrasives. Write Today!
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INDIVIDUAL PIECES • ANY SIZE OR SHAPE
For quick, accurate masking operations.
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Battery of Paint Baking Ovens.
A-Type Continuous Paint Baking Oven.
Continuous Dry-Off Oven.
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FINISHING OVENS
THE LANLY COMPANY • 770 PROSPECT AVE
CLEVELAND, OHIO
Continuous Monorail Oven with Air Seals.
LANLY Specialized engineers are daily consulting with progressive manufacturers and meeting the need for high grade, uniform, finishing oven production at satisfactory volumes.
Continued repeat orders vouch for LANLY competence.
Complete information and literature supplied upon request.
Batch-Type Oven.
Lay-Down Porcelain Enamel Dryer.
Multiple-pass Finishing Oven.

floor, wall or ceiling mounting, and consists of a heavy gauge sheet metal case. The heater contains one or more Chromalox Koilfin strip elements, sheathed with steel, and a motor blower.

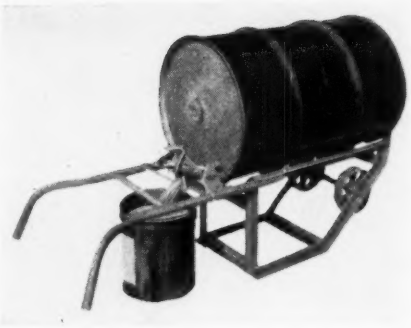
Eight-Inch Buffs

Pressure-Cooled buffs are now available in sizes as low as 8-inches in diameter from the United Buff Products Corporation, Passaic, N. J. The units are made primarily for machines in the silver and cutlery fields but may be used for hand operations.

The "300" series buffs are offered as a companion line to the "500" and "700" series. They are available in a variety of cloths and densities and feature a unit-type, metal-center assembly.

Combination Truck and Drain Rack

A combination truck and drain rack that is designed for industrial users of solvents and detergents, is now being manufactured by Palmer-Shile Co., 12613 Mansfield, Detroit 27, Michigan.



Combination Truck and Drain Rack

To load this truck, it is tilted against the drum and the steel fingers are moved down to engage top rim of drum. Then the truck is rocked back to wheeling position. By a slight downward push on truck handles, the wheels are raised and the rack layed on the floor, thus providing convenient drainage of drum. The truck is equipped with detachable handles that may be removed to conserve floor space.

Electrolytic Alkaline Descaling Process

Enthone, Inc., Dept. PF, 442 Elm St., New Haven, Conn., has announced its alkaline electrolytic process, using Compound 134, for derusting of metals. It is claimed that the process will accomplish effective and complete scale removal of metals by the use of periodic reverse current. Cathodic treatment of rusted steel

FUNCTIONAL FINISHES!!

If you require your coatings to accomplish some specific task — something beyond mere ornamental appearance or average longevity —

Try Us!

We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.

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FOR COPPER STRIPPING NON-DANGEROUSLY

Economical, Non-Electrolytic.

No special equipment required.

Write for descriptive brochure.

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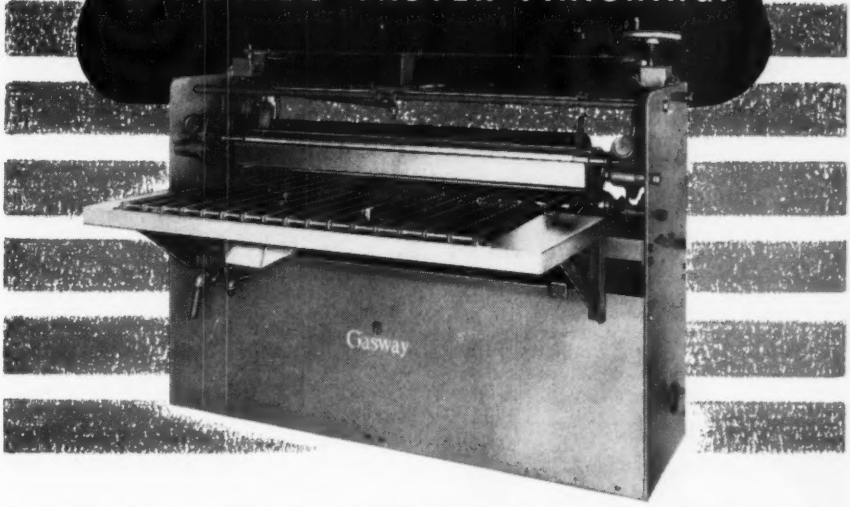
Rollacoat for economy

GET FINER—FASTER FINISHING!



The benefits to be gained by using the Rollacoat method of applying finishes and protective coatings, to practically any type of flat materials, are three-fold. In the first place coating speeds are greatly increased over those of any other method and are governed largely by how fast the coated materials can be handled or dried. Secondly, the coverage per sq. ft. per gallon is usually at least 50% greater, the only loss being the paint removed from the rolls at the end of a run. In the third place you obtain finer quality of finish due to accurate control of thickness and eveness of coat.

The applications of Rollacoating are numerous. Top, bottom and sides of practically any type of flat material, whether sheet or coil stock, can be coated by a single pass through the machine.

Special equipment for cleaning, treating, coating, drying, and rewinding strip in continuous process can be constructed to special order.

GASWAY CORPORATION

Write or wire today for the 12 page Gasway illustrated book describing Rollacoat Finishers, their possibilities and limitation.

6463 N. Ravenswood Ave.
Chicago 26, Illinois

parts is stated to accomplish rapid rust removal without any attack upon the base metal.

The application of periodic reverse current, in which the work is made the anode from 5 to 30 seconds and then the cathode for a like period of time, has made possible effective, clean removal of black heat treat, quenching and other scales on steel. Bulk descaling of small parts has been successfully accomplished in oblique tumbling barrels using a carbon electrode. It has also been reported that the periodic reverse alkaline descaling process produces a better surface for hard chromium plating with less danger of hydrogen embrittlement than when acid descaling is done. The process is also effective in removing smut from the surface of carbon steel.

Straight-Line-Action Air Sander

National Air Sander, Inc., 2820 Auburn St., Rockford, Ill., has introduced its Model 600, straight-line action, single pad air sander. This machine weighs five pounds, operates at 3200 r.p.m., has a $\frac{1}{16}$-inch pad stroke, and 25 sq. in. of abrasive area.

Straight-Line-Action Air Sander

The Model 600 has a built-in water spray for wet sanding work, and is available with either rubber or felt backing pads. Improved paper holders allow simple and quick paper changes. Paper size required is 3-2/3 by 9 inches.

The sander has been used in autobody shops and on industrial production lines, and has proven to be reliable and efficient, according to the manufacturer.

Non-Flammable Paint Remover

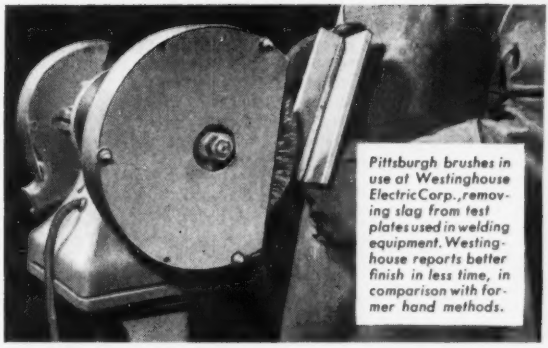
The Craftint Manufacturing Co., 1615 Collamer Ave., Cleveland 10, Ohio, has marketed a non-flammable paint and varnish remover. According to the manufacturer, it does not require heat to accomplish its purpose and thus removes the danger of fire in stripping operations. It works rapidly; any residue can be washed off with water and the metal repainted immediately. It works equally well on small or large areas; smooth, rough, or serrated surfaces; and can be used for more than one stripping operation.

Park
No. 290
BLACKENING
SALT

Black Oxide finishing for rust resistance and decorative parts. Speedy black coating in water solution with no electric current. Permanent black finish on ordnance parts, tools, aircraft, bearing races. Dazzling black decorative finish for television cameras, business machines, hardware, metal screens and machine parts. Excellent bond for paints and enamels. Simple one bath operation. Write for bulletin H-16. Park Chemical Co., 8078 Military Ave., Detroit 4, Mich.

PERMANENT SPRAY
GUN STRAINER
$1.25
ALL METAL →
PAINT
STRAINER
$3.95
WRITE TO:
GARDNER LABORATORY, INC.
BETHESDA • MD.
Send for Catalogue of Paint Testing Equipment

Replace hand finishing with power-driven PITTSBURGH BRUSHES for



Pittsburgh brushes in use at Westinghouse Electric Corp., removing slag from test plates used in welding equipment. Westinghouse reports better finish in less time, in comparison with former hand methods.

• Better Cleaning • Fewer Rejects • Lower Labor Costs

—as these companies did:

Removal of imbedded slag in welding test plates formerly was done by hand at the Westinghouse Electric Corp., Trafford, Pa., using a wire brush and welder's hammer. Pittsburgh brushes, powered by a direct-drive 1/2 h.p. motor, now remove more slag in less time, and produce a better finish. In addition, Westinghouse reports their Pittsburgh brushes "stand up better than average in use."

Complete cleaning of dried concrete, rust and scale from steel frames used in concrete forming is essential prior to re-using the forms. Pittsburgh wire brushes were installed at the Universal Form Clamp Co., Chicago. Working on a conveyor-fed machine, the Pittsburgh brushes now remove all foreign material at a rate of 50 pieces per hour, replacing former laborious hand brushing and scraping.

De-scaling preheated bar stock at the Dominion Forge & Stamping Co., Ltd., Canada, was formerly done by hand scraping. This never did a complete job, and inclusions resulted which produced defective forgings. Pittsburgh brushes, on specially-designed machines, now do the job, and have "increased efficiency, decreased the amount of scrap, improved work quality, and saved labor."

WRITE TODAY FOR FREE BOOKLET!

Write today for a free copy of our booklet that shows, through actual case histories, how Pittsburgh cuts brushing costs. Address: PITTSBURGH PLATE GLASS Co., *Brush Div.*, Dept. W-8, 3221 Frederick Ave., Baltimore 29, Md.

PITTSBURGH *Power Driven* **BRUSHES**

BRUSHES • PAINTS • GLASS • CHEMICALS • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

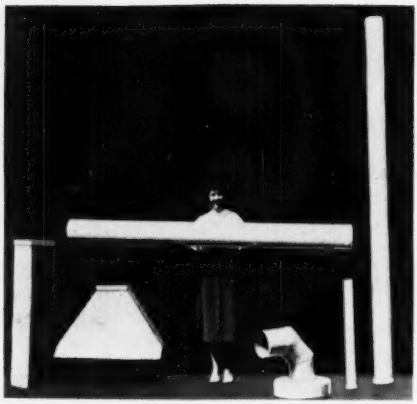
The manufacturer also states that this paint stripper does not corrode aluminum and should be applicable to aluminum components for the aircraft, truck body, and automotive industries. It can also be used in removing overspray from paint spraying equipment.

Plastic Ducts

Heil Process Equipment Corp., 12901 Elmwood Avenue, Cleveland, Ohio, announces the availability of a complete line of solid plastic corrosion-proof fume ducts, hoods and accessory equipment. General construction is offered in polyester glass combinations as well as Rigivin, rigid vinyl type, and Rigidene, polyethylene type.

Rigidon, the glass reinforced polyester resin combination, is stated to have a high strength-weight ratio and good resistance to acids. This plastic material will withstand operating temperatures in excess of 200 deg. F., and is claimed to be easy to install.

Units are standardized in both round and rectangular duct sections and hood designs and manufactured in accordance with the latest recommendations for ventilating open process tanks by the American Standards Association.



Round and rectangular duct sections and fume hood constructed of Rigidon glass reinforced polyester.

Stock Delivery ON VAPOR DEGREASERS and TANKS

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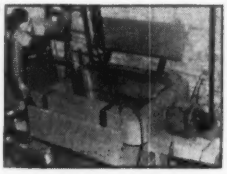
VAPOR DEGREASERS

Manual and Automatic

Complete equipment for: Anodizing, Phosphating, All Plating Processes: to comply with all gov't. specifications.



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VAPOR — SPRAY — VAPOR

Gas heated (thermostatically controlled) vapor spray unit for cleaning electronic equipment. Note the compact exhaust system and heavy duty split cover.

RANDALL MFG. CO., INC.
801 EDGEWATER RD., NEW YORK 59, N. Y.
DAyton 3-3900 - 1 - 2

P-30 Finger Buff

The Geo. R. Churchill Co., 7523 Fayette St., North Quincy 71, Mass., has announced the development of a finger buff, called the P-30, which is stated to be ideal for hand buffing and machine operations.

P-30 Finger Buff

Each buff finger of this buff is constructed by folding the cloth in pleats, and setting each pleated buff finger at the proper angle on the wheel. This pleated construction traps and holds the cutting compounds for all kinds of polishing and buffing requirements. The P-30 is produced in all types of cloth and in all sizes from 6 to 18 inches diameters.

Sicon Heat Resistant Finish

Sicon, a silicone base finish noted for its heat resistance properties, is now

Brake shoes "shined" at 66% savings by 3M Abrasive Belts!

PRODUCTION PROBLEM: To cut high unit costs of finishing brake shoes. Manufacturer found ordinary abrasive belts wore out after preparing only 50 units for bonding of linings. Frequent belt replacement kept abrasive costs at a high $.009 per finished unit.

RECOMMENDATION: 3M Sales Engineers suggested that Wagner Electric Corporation (makers of Comax Brake Linings) switch to longer-lasting 3M Abrasive Belts.

RESULTS: An *immediate* reduction in abrasive costs! Each 3M Belt finished 150 brake shoes—cut costs to only $.003 per finished unit.

Learn how 3M Abrasive Belts can cut *your* costs, too. Send coupon today for full information. No obligation, of course.

MINNESOTA MINING & MFG. CO.
Dept. PF122, St. Paul 6, Minn.

Send me complete information on 3M Abrasive Belts.

Name.....

Company.....

Address.....

City.....**Zone**...**State**.....

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3M
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BELTS
1902 ★ 1952

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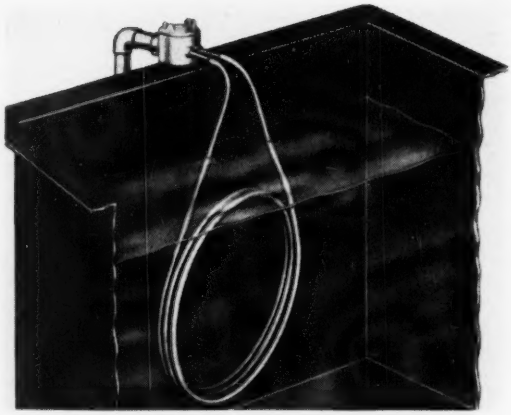
Makers of "Scotch"® Pressure-Sensitive Tapes, "Scotch"® Sound Recording Tape, "3M"® Adhesives, "Underseal"® Rubberized Coating, "Scotchlite"® Reflective Sheeting, "Safety-Walk"® Non-Slip Surfacing.

CTL Immersion Heater



available in decorative colors according to an announcement by Midland Industrial Finishes Co., Waukegan, Ill. These formulations are said to stand up with excellent film adhesion in the 400-500 deg. F. range without losing gloss, and without powdering or losing color.

Color applications of Sicon in tans, whites, beiges, blacks, and golds have already passed stringent laboratory tests and have been proved on the production line, it is stated. It is predicted that the finish will open up a new horizon to engineers working on products for which it is desired to combine colorful eye appeal with retention of color and gloss in the presence of sustained heat.

CTL Immersion Heater

Design of an immersion-type electric heating unit for electroplating baths has been announced by Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa. The CTL heater has a thick lead sheath which resists corrosive acid action of copper, chrome, and nickel solutions.

The new unit is stated to offer many advantages over steam heating, such as no dilution of the bath from live steam.

The heater, which is simply hung over the side of the tank, is rated at 5 KW. at 230 volts. Terminals are protected by a moisture-tight housing, and separate thermostatic control is possible for fully automatic temperature regulation.

Powerful, direct-connected (no gears), 3450 r.p.m., 100-120 v AC air-cooled motor. All sealed ball-bearing construction. Die-cast aluminum housing, polished. All-position handles. In hand weight only 5 lbs. Insulated with ground wire for wet as well as dry sanding or rubbing. Available accessories—deep contour pads, surface plates, felts, etc. Takes any sheet abrasives—3 covers 4½" x 6½" from standard 9" x 11" sheet.

A time saving quality tool priced so every worker can have one.

Write for Circular

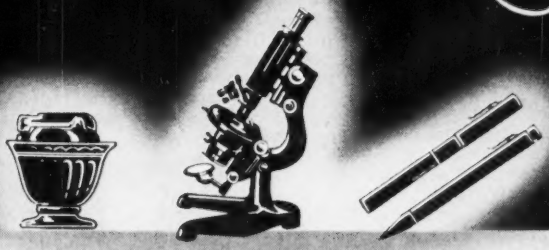
SpeedWay MANUFACTURING CO.
1895 So. 52nd Ave., Cicero 50, Ill.

PRODUCT LITERATURE

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Dimenso One-Coat. The Sherwin-Williams Company, General Industrial Division, Cleveland 1, Ohio, now has available Brochure D-506, which states the features and film characteristics of Dimenso One-Coat, a hammered finish. The brochure lists application suggestions under such topics as method, adjustments, surface preparation and drying. Results of a fingerprint test and a baking schedule are included.

Rhodium Plating



Rhodium is one of the six platinum group metals. It is hard and has an untarnishable brilliant white color. In electroplating, it produces beautiful results and is widely used for this purpose in jewelry — even precious metal jewelry. Its high reflectivity makes it excellent for mirrors for motion picture projectors and similar purposes. With restrictions upon usual plating metals, rhodium is the logical alternative for plating optical mounts, contacts for communication equipment, radar components, pen and pencil sets and a host of like objects.

Commercial rhodium plating was developed in our laboratories.

BAKER & CO., INC.

113 ASTOR STREET, NEWARK 5, N. J.

NEW YORK • SAN FRANCISCO • CHICAGO

Let us send you "Directions for Rhodium Plating."

Nestier Tote Box. The Chas. Wm. Doepke Manufacturing Co., Inc., Rossmoyne, Ohio, now has available a 4 page bulletin which fully describes and depicts the company's line of tote boxes. Illustrations explain how these boxes nest or may be tiered. Specifications are included.

Alumon. A four-page colored brochure, is available from Enthone, Inc., Dept. PF 442 Elm Street, New Haven, Conn., which describes plating on aluminum by the Alumon process.

The brochure highlights the advantages of this plating method, presenting details on such characteristics as metals that can be plated, throwing power, installation and plating costs.

Rodine Selection Chart. A technical service data sheet, No. 13-1-1-4, on Rodine, a standard pickling acid inhibitor, has been released by American Chemical Paint Company, Ambler, Pennsylvania.

This handy reference chart shows the uses of Rodine with sulphuric, muriatic and mixed acids. Characteristics such as temperature limitations, solubility, acid strength and other data are listed.

Industrial Heat Exchangers. A two-page data sheet which illustrates and describes the Industrial unit heat exchanger for plating solutions has been prepared by Industrial Filter & Pump Mfg. Co., 5900 Ogden Ave., Chicago 50, Ill. Applications and advantages of this single unit for heating and cooling are listed and specifications are given.

Dust and Fume Control. The Young & Bertke Co., 2235 Buck St., Cincinnati 14, Ohio, has released an 8-page catalog illustrating and explaining the company's line of equipment for dust and fume control in the finishing industry. Attractively printed in color, the catalog lists the many applications of dust control systems.

Cone-Loc Drum Sanders. A four-page two-color booklet which illustrates the Cone-Loc Drum Sander, a light, balanced polishing wheel, is available from The Carborundum Company, Niagara Falls, N. Y. Data and specifications for rubber cushioned and felt cushioned models are included.

Bulletin G 10. Metalwash Machinery Corporation, 901 North Avenue, Elizabeth 4, N. J., now has available a brochure on Metalwash equipment for washing, pickling, drying and painting operations. The booklet depicts and discusses the various units which the company manufactures. Important facts and features, advantages and applications of these various units are pointed out.

Catalog No. 60. Frederic B. Stevens, Inc., Detroit 16, Mich., now has available catalog No. 60 which fully describes and depicts Stevens Automatic Barrel Plating and Processing Machines. Special applications for these machines, the "C" and

ENGLISH WALRUS

Polishing and Buffing All Metals

Available in full Sides, half Sides, Pieces, Strips, Bobs and Wheels

SCO English Bull Necks

SCO English Buffalo

SCO English Polishing Ox Bends

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WEST ROAD NORFOLK 1, CONN.

new

National Air Sander

STRAIGHT-LINE ACTION...SINGLE PAD

FAST • LIGHTWEIGHT • VIBRATIONLESS

MODEL 600

$82.50

Here is National's new, powerful, high-production sander which weighs only 5 pounds but operates at 3200 rpm. Rapid stock removal is assured by the 5/16" stroke and 25 sq. in. of abrasive area. Either felt or rubber backing pads are available, and a built-in water spray makes wet sanding easy. National manufactures a complete line of block sanders, offering either orbital or straight line action . . . electric or air driven.

Write for further information today!

NATIONAL NS SANDERS

NATIONAL AIR SANDER, INC.

2820 AUBURN ST. ROCKFORD, ILLINOIS

Porcelain enamel frit from the new Osaka, Japan plant of the Ferro Corporation is used in the holloware manufacturing plant of Nitto Enamels, Ltd., Tokyo, Japan. Assisting in the transporting effort are two enthusiastic boosters of Ferro-Japan frits; (left) Mr. Teiken Harada and (right) Mr. William E. Braden.

(PRODUCTS FINISHING Staff Photo)

Super "E" are taken up in detail. Such special features as complete automatic loading and unloading are also included.

Sheet and Plate Fabrication is the title of a brochure which has been issued by The Kirk & Blum Manufacturing Co., 3116 Forrer Street, Cincinnati, Ohio. Containing over 40 pages of illustrations of the fabricating plant facilities, the booklet also gives a comprehensive view of many of the typical parts and products the firm regularly manufactures.

The products illustrated are made from galvanized and black sheet steel, a wide range of alloys including aluminum and stainless, plate up to ½-inch thickness, and light structurals. Plant data covers shearing, contour cutting, punching, stamping, and other operations.

Detrex Phosphate Coatings. An 8 page booklet has been released by the Detrex Corporation, Box 501, Detroit 32, Mich., which illustrates and explains Detrex phosphate coatings for immersion and spray application. Printed in color, the booklet explains and illustrates the methods of using coatings 701 and 702 and describes their resistance to salt spray.

Infra-red Baking Oven Specification Sheets. The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio, is offering leaflets listing features and pertinent data on various models of infra-red baking ovens and panels. These sheets are illustrated and present clearly the outstanding features of this equipment. Various applications and advantages are cited.

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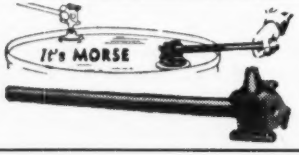
DRUM PLUG WRENCH

Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!



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Non-sparking type ....$4.60 *Plus Parcel Post*

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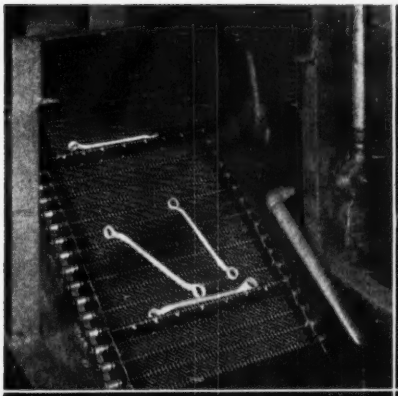
125 Dickerson, Syracuse 2, N. Y.

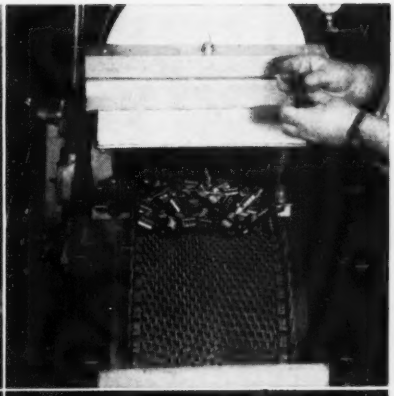
For a real good polishing job use

Keystone TURKISH Emery

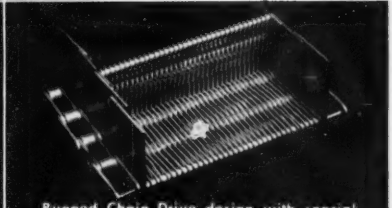
FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.





COMBINE
movement with processing
REDUCE
rejects and handling costs



Rugged Chain Drive design with special retaining flights and plate edge for holding parts during upward movement.

with a Cambridge Woven Wire Conveyor Belt

Regardless of the type or size of part, or of hot, wet or corrosive processes . . . a Cambridge belt can help you reduce rejects and handling costs by continuously conveying your product through the process medium at a controlled rate of production.

Open mesh of the belt allows immediate drainage of process solutions or complete circulation of hot air or gases. Special alloy wire for wear resistance means long belt life, low ultimate cost.

Want to know more? Just call in your Cambridge field engineer. He'll be glad to work with you to select the best belts for your plant. Write direct or see "Belting-Mechanical" in your telephone directory.

FREE BELT MANUAL!

describes Cambridge weaves, gives conveyor design and useful metallurgical data.

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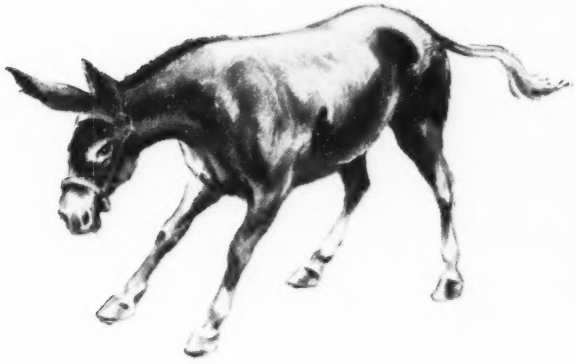
Jenny doesn't live here any more!



YES, in the modern coal mine there's no room for Jenny. Today, powerful electric locomotives pull 50 times the load that Jenny hauled to the mine surface.

And in today's mine, even the traditional pick and shovel are out-of-place! More than 90% of *bituminous* coal is now mechanically cut, over 70% is mechanically loaded. Result: more economical coal to light the way, fuel the fires, power the progress of America.

But, basically, what caused Jenny to disappear? What's behind American industry's ever-more efficient machines that turn out goods at lower cost—thus making them available to more people? One word tells the story—COMPETITION.

In the coal industry 5,000 privately managed coal companies compete with one another. When one company develops more efficient methods, the rest can keep pace only by striving to improve even further. No wonder that, with his modern machines, the American miner's daily output is 4 to 24 times that of any miner in Europe or Asia—most of whom work in government-controlled coal industries.

Just as competition spurs *you* on to trying harder—competition goads the individual company to deliver products that will outsell. And competition keeps a whole industry on its toes, cutting distribution costs, opening new outlets, delivering better products.

Competition—not government control—has already made America the most productive nation on earth. Competition—not regimentation—points the way to ever greater plenty for all of us.

★ ★ ★

This report on PROGRESS-FOR-PEOPLE is published by this magazine in cooperation with National Business Publications, Inc., as a public service.

THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

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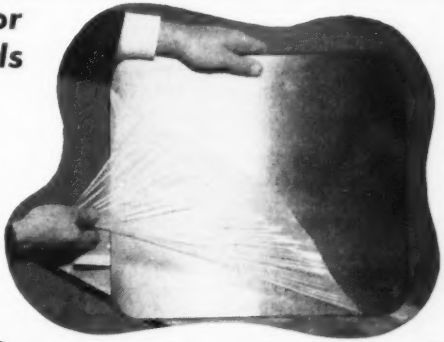

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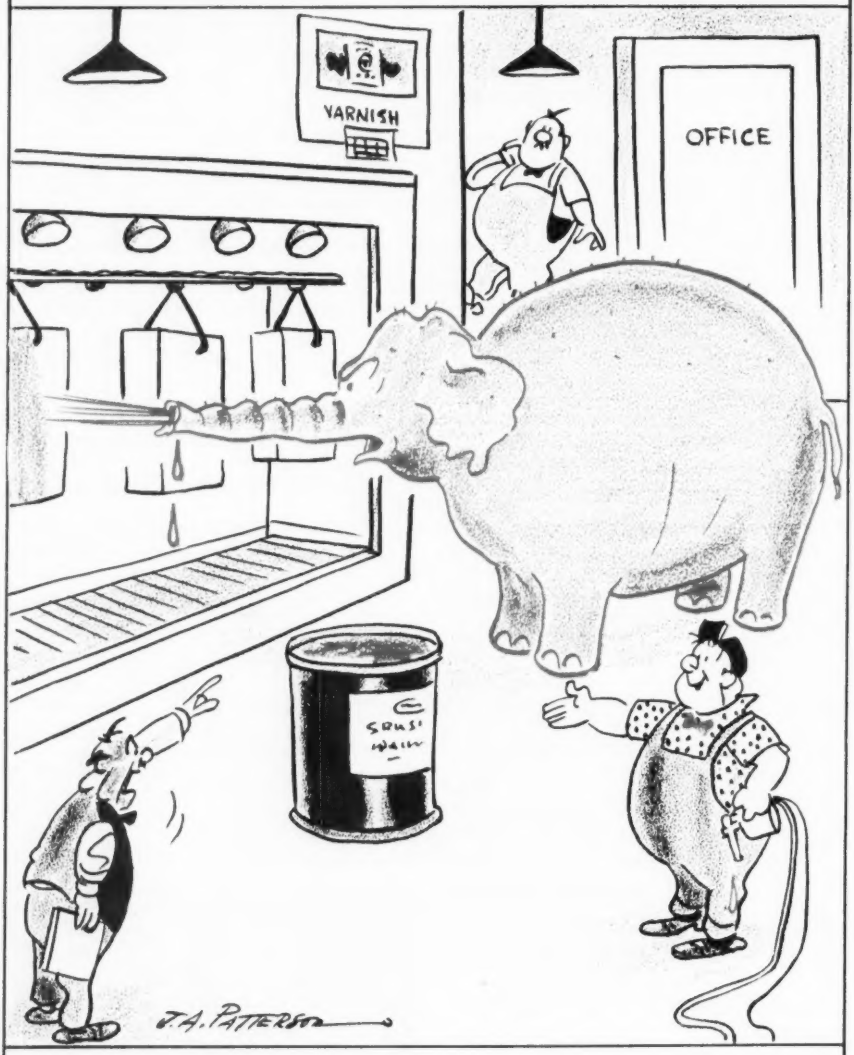

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Catalog No. 60. Hammond Machinery Builders, Inc., 1600 Douglas Avenue, Kalamazoo, Mich., has available a 24-page colored brochure on the company's line of polishing, buffing, grinding and deburring equipment.

Profusely illustrated with models of the various machines, the catalog describes each piece of equipment and lists its standard specifications. Abrasive belt and contour finishing machines are included.

Harshaw Chemicals for Industry and Laboratory. The Harshaw Chemical Co., 1945 East 97th Street, Cleveland 6, Ohio, now has available a 16-page, colored booklet designed to give the reader an overall picture of the company's line of products.

Starting with the Cleveland general offices and research laboratories, the brochure depicts and explains other plants of the company and their warehouses. Complete listings of chemicals and anodes for plating needs, fluorides, Harshaw driers and metal soaps, pigments and ceramic colors, and chemicals are listed and tabulated.

Gardner Bubble Viscometers and Tube Holders. A four page folder which describes bubble viscometers in various series for extremely light bodied lacquer, for varnish, for heavy bodied oils, for rubber, and for lithographic varnish, is available from Henry A. Gardner Laboratory. Inc., 4723 Elm St., Bethesda, Md. Each viscometer is illustrated. Also described and illustrated are Gardner Tube Holders in various capacities.

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